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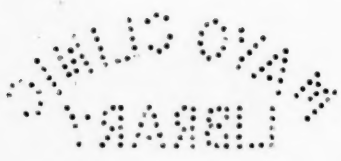

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Original Articles

Infections in the New-born Infant and Their Treatment

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There is some difference of opinion as to the exact time when the human animal ceases to be a "new-born" and enters upon the still unstable career of babyhood. The transition is certainly a gradual one and there is no sharp demarcation, but an infant during the first month of its life possesses anatomical and physiological characteristics which serve to differentiate it from an older infant.[1] The scope of this paper does not permit dilation upon these characteristics, but it will be of advantage to the therapeutist—when he is combating infection—to remember that the more youthful the organism the more serious are the consequences of infection. The new-born infant, especially if feeble or premature, has a poorly developed nervous system, heat centers, digestive and respiratory tract. As Dunn[2] points out, this "lack of development is not a cause of disease but an important etiological factor combined with causes acting from without," and it must also play a significant rôle in affecting symptomatology and prognosis and in modifying treatment.

Before formulating the treatment of infections in the new-born infant it becomes necessary to know what infections may occur in the first few weeks after birth, and also to determine, if possible, the mode of invasion into the organism of the infective agents. This latter consideration is of prime consequence if one is to practice the most important form of treatment—the preventive.

It is of interest to note that the new-born infant is occasionally subject to certain infections which are not peculiar to its time of life, but which are usually met with only in older children. One must be cognizant of the occurrence of these diseases in order that the proper treatment may be instituted.

Unless the mother has immunity the baby is susceptible to diphtheria from birth.[3, 4, 5, 6, 7] Diphtheria of the nose should be suspected even in the first few days of life if there is an irritating or bloody nasal discharge.[8] While the carrier state is a possibility, a large percentage of new-born infants harboring diphtheria bacilli will develop active symptoms of the disease.[6] The fact, therefore, that the diphtheria bacillus is found upon culture should at once arouse the suspicion that a diseased condition is diphtheric in origin and treatment should be given. Diphtheria may attack the umbilical stump with greater frequency than is commonly supposed to be the case.[9, 10, 11] Diphtheria in the new-born infant, wherever its location, should be

treated by the subcutaneous injection of diphtheria antitoxin. At least 2000 units should be given, and this dose may be repeated within twenty-four hours if there is no tendency to disappearance of the diphtheric process. Diphtheria affecting the nose and throat of very young babies is a very fatal condition, the mortality varying from 30 to 90 per cent.[6, 8, 12] If diphtheria is present in a maternity ward it should be the practice to inject each infant shortly after birth with 200 to 500 units of diphtheria antitoxin. This procedure will effectively prevent the onset of the infection.[12]

The new-born infant may also acquire certain other of the contagious diseases. From the point of view of treatment these diseases have mostly an academic interest, inasmuch as they have no specific treatment, or specific treatment for them is, as yet, in the experimental stage. *Scarlet fever* can rarely be found in the first weeks of life.[13, 14, 15] The possibility of treating scarlet fever by the injection intravenously (longitudinal sinus) or intramuscularly of convalescent's serum should be remembered. Five cc repeated two or three times at 24-hour intervals should be a safe procedure and worthy of trial, as it has seemed to have a beneficial effect in severe scarlet fever in older children.[16, 17, 18] However, in young infants scarlet fever is mild in character and symptomatic treatment will be all that is usually indicated.

Measles is another of the acute contagious diseases rarely seen in the new-born infant,[20,21] although immunity is present only in those babies whose mothers have had the disease.[22, 23] Serum prophylaxis of measles has been practiced recently in order to prevent the spread of the disease in institutions [24, 25, 26, 27, 28] and seems to be most effective. If a young baby is definitely exposed to measles and it should be ascertained that the mother had never had the disease, it would be rational to inject the baby intramuscularly with 3.5 to 4.0 cc of convalescent's serum. The serum is obtained from uncomplicated cases of measles one to two weeks after convalescence.

That *whooping-cough* can be contracted at birth, or shortly after, is quite certain.[29, 30, 31, 32, 33, 34] The great difference of opinion with regard to the efficacy of vaccine treatment and vaccine prophylaxis of whooping-cough renders a discussion of it rather unprofitable at the present time. If vaccines are used they should be fresh [35, 36] and given in small dosage—about one-half of that which would be given to an older infant. Reports too numerous to mention have recently appeared in the foreign literature on the ether treatment of pertussis. This consists of the intramuscular injection of 0.5 to 5.0 cc of ether every other day to a total of six to ten doses.

Smallpox is seldom seen in the new-born infant because of the lack of exposure to the disease. When there is opportunity for infection smallpox may be contracted by the youngest infant.[37, 38] When exposure has taken place immediate vaccination should be performed.

The *skin* of an infant for some time after birth is a poorly developed and imperfectly functioning organ. There is greater tenderness, vulnerability and sensitiveness of the infant's skin as compared to the adult.[39] The utmost care is necessary in order to prevent infection. Roughness in handling, the use of coarse toweling, or the continued contact of urine or feces may cause irritation or abrasion sufficient to allow the entrance of microörganisms. Once established infection of the skin tends to spread rapidly and is difficult to cure. Very early in life the staphylococcus or the streptococcus may gain a foothold in the skin. The result of staphylococcus infection will usually be furunculosis. The streptococcus may cause a dermatitis, gangrenous in type or erysipelatous in nature. Various other organisms may occasionally be found as the cause of skin infections in young babies —even the gonococcus has been incriminated as a probable causative agent.[4] Syphilitic eruptions, especially the fissures around the mouth and anus, may be further infected and a severe and even gangrenous dermatitis be superimposed.[41] The sensitive skin of the young baby may readily

show the effect of drugs taken internally. It should not be forgotten that certain drugs taken by the mother may be eliminated in the breast milk and her nursing infant develop the characteristic eruption. Congenital bromoderma of an ulcerating type has been reported,[42] the ulceration presumably being due to secondary infection as it is not typical of a bromide eruption. Impetigo contagiosa and pemphigus readily involve the skin of the new-born infant.

In preventing infection of the skin emphasis should be placed on the avoidance of irritation and abrasion and the protection against bacterial contamination. The same caution applies to the care of the mucous membranes. This means that the baby should be bathed at least once in twenty-four hours; that only the purest of soaps should be used; that drying after the bath should be done by patting (not rubbing) with a soft material; and that at the completion of the bath the body should be dusted with talcum. Frequent changing of the diaper is necessary. If the skin is unusually sensitive, water softened with bicarbonate of soda (a drachm to the pint) should be used and soap of any kind dispensed with. A little olive oil will suffice to cleanse the axillæ, the buttocks, and other crevices. Corn-starch will be found to be an excellent dusting powder for an irritated skin. The mucous membranes are to be allowed to care for themselves. It is not necessary to wash out a baby's mouth, to probe deeply into the ears and nostrils, or to flush out the conjunctival sac when there is no disease. One is likely to do harm by abrading the mucous membrane and thus allow microörganisms to enter. It should go without saying that anything used in connection with the baby's bath, such as cloths, towels, and vessels, should be scrupulously clean.

When infection of the skin has developed the great sensitiveness of the skin should again be borne in mind and only the mildest of local applications used. If a wet dressing is indicated, salt solution, boric acid or magnesium sulphate should be the choice. If an ointment is used it is better to incorporate the ingredients in a base of lanolin, which seems to be more soothing to the infant's skin than petrolatum. When ichthyol is used it should not be over five per cent in strength. In continued staphylococcus infection the use of autogenous vaccine should be considered, giving a small dose of about 5,000,000 organisms at the initial injection.

Pyelitis may occur in the new-born infant.[43, 44] The vagina contains staphylococci and streptococci within a few hours after birth, and as early as the fifth day of life colon bacilli can be found on culture.[45]

The route of infection in pyelitis is, of course, not settled, and there is considerable argument against the theory that organisms ascend from the urethra and bladder. Nevertheless, as far as possible contamination of the vagina and urethral orifice should be avoided in the daily cleansing of the vulva by carrying the direction of the washing toward the anus.

Meningitis is by no means a rare infection in the new-born infant and may be due to a variety of organisms.[46, 47, 48, 49, 50, 51] As might be expected meningitis in the first few weeks of life has a high mortality. If the meningococcus is found upon smear or culture antimeningococcus serum should be given. It is possible that the more direct introduction of serum into the ventricle or by the newer method of cistern puncture would better the prognosis in these cases.[52, 53]

Tetanus neonatorum has become a most uncommon condition wherever cleanly obstetrics is practiced. It does occur occasionally and has a bad prognosis. The portal of entry is usually the umbilicus, and if this is remembered the prophylactic treatment is clear, namely, aseptic handling of the umbilical stump. Vigorous treatment by intravenous (longitudinal sinus) and intraspinal injection of serum should be carried out when the disease has developed. The open fontanel offers a ready means of injecting antitoxin directly into the ventricles. About half of the antitoxin used

should be given intravenously and the other half intraspinally or into the ventricle; 5000 units are injected, and this dose repeated every four to eight hours until a total of 30,000 or 40,000 units are given. The aim of treatment should be to saturate the patient with antitoxin before fixation of the toxin has occurred in the cells of the spinal cord.[54] Tetanus neonatorum developing in an infant in a situation where other new-born infants would be exposed should be the indication for the immediate injection of all exposed infants with 500 units of tetanus antitoxin as a prophylactic measure.

Erysipelas in the new-born infant is usually an infection of umbilical origin, the organisms traveling drown the hypogastric artery to the tissue between the umbilicus and the symphysis pubis and infecting the umbilical region and the scrotum.[55] It is really then a form of sepsis, and its treatment will be discussed later.

The treatment of syphilis is too extensive to be taken up in a paper of this scope.

Sepsis is the most important infection to be considered. A great variety of organisms may be causative agents, the most frequent of which are the pyogenic cocci, the pneumococcus, the colon bacillus, the influenza bacillus, and the bacillus of Friedlander. Organisms usually gain entrance to the body through the umbilicus, but the skin and the mucous membrane of the respiratory or intestinal tract abraded as the result of irritation may be the portal of entry.[56] Occasionally the eyes or ears or the buccal cavity initiate the infection or an operation for circumcision or incision of the frenulum linguæ allows organisms to enter.[57] Some cases are cryptogenic—no portal of entry being discoverable.[58] The opportunity for infection is frequent unless care is taken in handling the new-born infant. Hemolytic streptococci are almost constantly present on the nipple of the nursing mother, [59] and 100 per cent of infants are born with bacteria in their mouths. Infection may begin before birth —infected liquor amnii being aspirated,[56] or dry labor rendering easy access of germs to the mouth and nose and throat of the fetus.[55]

The diagnosis of sepsis is not always easy. The location of the septic process depends upon the portal of entry and the lesion may be in the skin (erysipelas), the lungs, the liver, the meninges, the bones, the joints, the kidneys, or the gastrointestinal tract. Progressive emaciation, marked anorexia and uncontrollable diarrhea are general symptoms. Initial fever with subsequent subnormal temperature is the rule. Internal and external hemorrhages and icterus are common.

The very bad prognosis of sepsis in the new-born infant makes its prevention of greatest importance. Exposure to bacterial contamination, which in an older child or an adult would not result in infection, may in the young baby give rise to a septicemia. This is easy to understand if one will recall that the new-born infant has an undeveloped skin and mucous membranes, immature lymph nodes, friable blood-vessels, and an insufficient capacity for manufacturing protective substances.[56] The precautions already outlined for the care of the baby's skin, the details of the bath and the aseptic dressing of the cord are minutiæ which must receive the attention and direction of the physician.

The treatment of sepsis does not offer great possibilities, but should, nevertheless, be pursued with vigor. It is only the enthusiast, having sufficient knowledge not to overtreat, who will succeed in saving a few of these cases. Authorities agree that the treatment is symptomatic and supportive. Vaccines offer nothing as the infection is usually not a local one, and also because it is difficult to stir up antibody formation in the new-born infant. It seems to us that antistreptococcus serum should be more widely used when the causative organism is proved to be the streptococcus. Five cc could be given intravenously or intramuscularly every eight to ten hours. A nonspecific measure of undoubted value is the injection of citrated blood intravenously and

intramuscularly in doses of 15 to 30 cc repeated every twelve to fourteen hours.

In the treatment of any infection, no matter what the type, certain principles should be observed. The nutrition should receive first consideration. A lowered nutrition produces a predisposition to infection and modifies its course.[60] Babies with febrile disorders and especially with sepsis show a marked inclination to refuse food. To a certain extent this is dependent upon the lowered tolerance for food which exists in these conditions, but it must not be allowed to proceed to the point where the infant is using up its own body fat and protein in an effort to maintain heat. Breast milk is, of course, the ideal nourishment, and if the baby is too feeble or sick to nurse, the breast should be pumped and the milk fed with a dropper or a Breck feeder. In some cases it may be well to dilute the breast milk with water or with five-per-cent lactose solution. If there is no breast milk available a weak boiled cow's milk mixture may be used.

Just as important as the food intake is the fluid intake. To a certain extent the two are synonymous—that is, if sufficient food is taken and retained there will usually be enough fluid retained to supply the demands of the baby. Often, however, what little fluid is given by mouth is vomited, and there is also much fluid lost from the body by diarrhea. In sepsis, for example, it has been stated that intractable diarrhea is almost a constant symptom. The anorexia, the emesis and the diarrhea constitute a vicious triad, especially when it is noted that the water metabolism even in the normal new-born is insufficient.[61, 62, 63] One can readily see the difficulty of supplying fluid by mouth or rectum. Intraperitoneal injections are contraindicated when there is a septic process,[64, 65] and the unhealed umbilical stump would add another reason why fluid could not be given into the peritoneal cavity. The intravenous route cannot be repeated at too frequent intervals and is unsafe except in expert hands. There remains, therefore, only the subcutaneous method, and as much fluid as possible should be given in this manner at intervals of eight to ten hours.

A collection of pus in an accessible place should be opened. In searching for the source of infection the fact should not be forgotten that the umbilicus may allow entrance of organisms and subsequently the surface of the stump close. If the umbilicus is infected, drainage of the stump should be instituted by opening the stump, with care to avoid hemorrhage.

Drugs have very little place in the treatment of sepsis. Brandy or whisky seems to be of value when given in doses of two to three minims three times a day. Tincture of digitalis may be administered in doses of one-half of a minim three times a day if the heart action is feeble.

SUMMARY.

The new-born infant frequently suffers from infection of various types. Rarely the acute contagious diseases such as diphtheria, measles, whooping-cough and smallpox may be discovered. Pyelitis, meningitis, tetanus and erysipelas are also to be mentioned. While the skin is a point of entrance for microörganisms which may be the ultimate cause of systemic infection, the most important portal of entry is the umbilicus. Sepsis is the most common infection of the new-born infant and is difficult to diagnose at times. In the treatment of infection, advantage should be taken of any measures which are of a specific nature and which have seemed to be of value in older children. Thus, diphtheria should be treated by the injection of diphtheria antitoxin; measles may be treated by the injection of convalescent's serum; whooping-cough may (if desired) be treated by the use of vaccines; and tetanus should be treated by the injection of tetanus antitoxin. The object in all cases should be the prevention of infection by avoiding exposure. In the prevention of sepsis, cleanliness and care in handling the skin and the umbilical stump are measures of first consideration. When sepsis has

developed the best single supportive measure is probably the injection of citrated blood. In the treatment of any infection, the maintenance of nutrition and a sufficient supply of fluid must always be considered.

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The Treatment of Hemorrhages of the New-born, Not Including Brain and Spinal Cord

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By way of introduction, this paper is largely concerned with measures for the immediate control of hemorrhage, inasmuch as a new-born will be regarded as from birth to the fourteenth day. Therefore, matters of hygiene affecting recurrence of hemorrhage in later infancy will not be considered. It may be well to recall that, outside of the commoner traumatic birth hemorrhages, free bleeding that demands treatment occurs from once in 150 deliveries (Townsend) to once in 230 births (last 1600 deliveries in the University Maternity); and that the mortality from the usual type of these bleeding cases (hemophilia), without special remedies, varies from 35 to 87 per cent. On the other hand, under prompt blood injections the mortality drops to the remarkable figure of 2.3 per cent (43 cases).[1]

There are features of the new-born infants suffering from bleeding that must likewise be constantly in one's mind. These patients are most susceptible to shock from loss of blood; more important, the amount of blood lost is often difficult to estimate, being frequently internal as well as superficial; and lastly, since the total blood volume averages 14 per cent of the body weight,[2, 3] a baby of eight pounds possesses only about eight ounces of blood, of which a loss of four ounces (one-half of total quantity) will produce exsanguination.

Certain preliminaries to active treatment of hemorrhage in new-born will prevent accidents of this nature. This is not the place to describe how to prevent hemorrhage from improper umbilical cord ligation, from umbilical infection, from congenital syphilis, and birth injuries, yet here can be mentioned two means to prevent hemorrhage:

First, estimation of blood-clotting time. In institutions this should be a routine procedure, and in individual work should be performed before any surgical procedure, especially before circumcision.

Method: For practical purposes, make a generous stab in the infant's heel pad, collect the blood in a clean watch crystal containing one No. 6 chilled shot until a small pool forms. Cover with an inverted watch-glass and roll the shot until clotting occurs. If by this simple method no coagulation takes place within ten minutes, the infant should suffer no traumatism, surgical or other, and should receive treatment described later for moderate hemorrhagic disease. It must be admitted that the above method fails to consider the effect of temperature, depth of stab wound, etc., but the only absolute technique is tedious and includes vein-puncture. The normal increase of coagulation time during the first week of life must be regarded.

Secondly, the family history may show a definite tendency to hemophilia, in which case the infant should receive treatment as if it were actively suffering from early or mild hemorrhagic disease. One case recently under our care will serve as an example: A baby, the sixth child normally delivered of a healthy mother whose Wassermann was negative, became excessively jaundiced on the third day. Of the five preceding children, only one survives now, aged 3¼ years; four died within one month of birth, three showing marked jaundice and hemorrhage from the bowel. The sixth infant was given repeated injections of maternal whole blood, did not bleed, and rapidly became well, but six weeks after discharge nearly bled to death elsewhere from inadvised circumcision. Parenthetically it may be added that of the four fatal cases, three were boys, and the father was a "bleeder." Porter and Carter (Management of the Sick Infant) state that idiopathic hemorrhagic disease of the new-born appears in twelve boys to one

girl, and our records show that female infants are more frequently affected than is generally supposed.

Coming to active treatment, there appear advantages in dividing the cases into two groups in so far as the type of treatment is concerned.

GROUP I.—Local remedies for single, usually simple bleeding. In order of importance these will be mentioned, as follows:

From the Umbilicus: Primary bleeding from this site is not important, and may be corrected by religation of the cord stump. Secondary hemorrhage from the navel, *i. e.*, after dropping of the cord, can be dangerous and very troublesome from mechanical cause alone, since isolation of the bleeding vessels is usually impossible. There are, however, satisfactory means always available: (1) Simple pressure for moderate oozing, by sterile tampon held against the navel by adhesive plaster encircling the body. (2) Gauze pad saturated with one of the following products: hemoplastin (Lapenta), or coagulose, thromboplastin, normal horse serum, adrenalin, powdered suprarenal extract or coagulen (Ciba). (3) Successive layers of powdered bismuth, gauze, and collodion. (4) Liquid plaster-of-Paris, allowed to "set" in the umbilical crater. (5) The safe method for severe mechanical (single) umbilical hemorrhage is the use of harelip pins or ordinary large sewing needles, two of which, if the stump can be drawn out, are passed through the stump, and serve as retainers for a ligature tied beneath. Frequently there is no stump; therefore, under surgical cleanliness, the abdominal wall is lifted and rolled between thumb and finger, while one needle transfixes the fold just below and another just above the umbilicus. By ligating beneath each needle, the lower hypogastric arteries and upper umbilical vein are occluded. If after this procedure bleeding continues, the situation obviously belongs to the hemorrhagic group, treatment of which comes later.

From the Frenum: After circumcision or retraction of the prepuce. One mattress suture surrounding the severed artery of the frenum and, if required, a similar suture including the dorsal vein of the penis will suffice for simple bleeding. Continuation of hemorrhage after simple suturing is a manifestation of blood disease, which could have been recognized and prevented by coagulation time estimation, but if present may be controlled by blood or serum injections as described in Group II.

Surface Hemorrhage: Ulceration of the upper intestinal tract, while not necessarily due to hemorrhagic disease, is treated as the latter condition at the appearance of blood vomiting. Cephalhematoma, single or double, and hemorrhage into the sternomastoid muscle are interesting types of traumatism. In the former condition there is danger in interference, especially surgical, since infection via scratches or removal of the clot may lead to meningitis.

Swelling of the sternomastoid muscle can be reduced, and the danger of wryneck very much decreased, by application of heat and gentle massage.

From the Vagina: Many girl infants (one in thirty, DeLee; one in fifty, University Maternity) show blood-stained vaginal discharge in the first week. This condition fortunately never requires attention unless it is part of hemorrhage elsewhere (hemophilia), in which case it occurs profusely, but is not treated locally. Hemorrhage from the urethra likewise demands Group II treatment if severe.

GROUP II.—Here lie the dangerous, often multiple hemorrhages, intractable to local remedies, or inaccessible except through systemic agents. Human blood or animal serum injections have reduced the mortality of these accidents from 87 to 2.3 per cent by immediate control of bleeding. Before naming the types of hemorrhagic disease and methods of treatment, we should review the causes of excessive hemorrhage from trivial injuries or from no injury at all (idiopathic). Normally blood clots (Howell) by interaction of the following substances; at the shedding of blood, thromoplastin (in the tissue juices)[4] neutralizes antithrombin which has been held in combination with prothrombin in the blood, so that prothrombin becomes free

to be activated by calcium in the blood plasma, forming thrombin. This in turn converts soluble fibrinogen from the blood into insoluble fibrin or "clot." Whipple has shown that hemorrhagic disease of the new-born can be grouped as follows:

(1) Failure of prothrombin; the usual cause of "idiopathic hemorrhage," most frequent of all types.

(2) Failure of fibrinogen—liver abnormality; possibly syphilitic.

(3) Failure of calcium — obstructive jaundice.

(4) Failure of antithrombin—sepsis.

Since whole blood or serum injection controls hemorrhage in any of the above types, even in small amount, the conclusion must be that prothrombin is the material of most importance, but each of the other products transmitted with the injection of blood must be given credit at least on theoretical ground in each type. New facts from blood studies in new-born infants[5] prove the rationale of blood injections.

Lucas has demonstrated that hemoglobin drops 10 per cent and that red blood cells diminish from 5,500,000 to 4,500,000 in the first two weeks of life, irrespective of whether the cord is ligated early or late, and that hemolysis at this time is favored by increased fragility of the red cells; that the blood platelets are reduced in quality, thereby forming less prothrombin, the number of platelets being of no importance; that although the blood content of calcium (9 mgm. per 100 cc) does not diminish in the first days of infant life, yet calcium combines with the bile pigments which circulate in the blood during obstructive jaundice; and finally that bile is recovered in the blood plasma when there is no clinical jaundice at all. For these reasons it is little wonder that hemorrhagic disease appears not infrequently at this time of life.

To treat these cases, blood is the means of saving life. Although only eight years ago[6] administration of gelatin and calcium was the favorite method, at that time the present form of treatment was growing, and has now rendered the former substances obsolete. It matters not whether the bleeding is called hemophilia, manifest as bowel hemorrhage (melena), and superficial; whether purpura hemorrhagica, including surface and joint bleeding (morbus maculpsus) with visceral, allied to the aplastic or primary anemias;[7] whether largely from the urethra (Winckel's disease, or epidemic hemoglobinuria), or what not. The main point is that the bleeding is either without cause or too much hemorrhage from slight trauma, usually multiple and stubborn to local treatment, all included under idiopathic hemorrhagic disease of the new-born.

Method: For moderate or very early bleeding the procedure is simple. Place the baby face down and back exposed on a table beside the mother's bed. Prepare the mother's arm as for Wassermann blood taking; and through a sterile ordinary 10-cc syringe with long Wassermann needle withdraw a syringeful of blood from the vein, and immediately inject the whole blood before clotting can take place intramuscularly into the child's right or left buttock or between the shoulder blades. Follow this by light massage for a few minutes, and repeat at a different situation in six hours, until from four to six injections have been given. Two modifications of this method are very successful. Instead of injecting whole blood from the mother, the serum alone can be used after it has separated following transfer of the blood from the syringe to a sterile beaker. Normal horse serum can be similarly used, or antidiphtheritic serum, but only after the anaphylactic test—*i. e.*, injection of two or three minims of the horse serum, delaying further injection for ten minutes to give time for skin reddening, urticaria, etc., to appear, which, if produced, contraindicate the use of this serum. Horse serum can be repeated every six hours for twenty-four or forty-eight hours, but should then be stopped and used no further. Hemoplastin (Lapenta) can be used by this method, in smaller amount (2-3 cc), and can be conveniently carried in an obstetrical bag since it keeps well.

By far the best method is that of whole blood. While the mother makes the most practicable donor, any healthy adult with a negative Wassermann may be utilized, and no grouping of blood nor anaphylactic test is required.

For Severe or Protracted Hemorrhage: The problem is to control bleeding and to make up blood loss. Several means will accomplish this end, but the best is injection of from 50 to 100 cc of whole blood into the infant's circulation. Precaution—if possible, grouping of donor's and infant's blood should precede the injection, in order to find either a No. 4 donor or one in the same blood group as the infant. In emergency, either the blood of father or mother may be used without grouping, because the chances are that in over 55 per cent of cases[8] the infant's blood will match that of either parent. Occasionally the infant's blood cannot be grouped by the present method. Malaria and syphilis must be ruled out before taking donor's blood; smallpox was transmitted in one case.[8]

Method: Using a 50-cc syringe, blood is withdrawn rapidly from the donor's arm, and injected via the Goldbloom protected needle[9] directly into the superior longitudinal sinus, or more readily into the internal saphenous vein at the inner malleolus before clotting occurs. A second injection (total 100 cc) for exsanguinated cases will be required, using a fresh syringe, the maximum amount for a medium size baby being 150 cc. This method is a complete procedure and does not have to be repeated.

Next in importance is injection of citrated blood.[10] The same precautions are required as in the use of whole blood, but the method is limited, since citrate in itself will cause severe reaction (30 per cent) and will destroy blood platelets. Ravdin and Glenn specify pure citrate in freshly prepared solution to prevent reaction, nevertheless in infants this method cannot be used in (1) exsanguinated infants; (2) markedly anemic infants. The injection is simple, the donor's blood being received through a large needle into a sterile flask containing 10 cc of 2-per-cent sodium citrate solution, continuously stirred until 100 cc have been obtained. The blood is transferred to a gravity jar and injected slowly while warm into the superior sinus or into the saphenous vein. Where blood grouping has not been possible, the "physiologic test" will prevent accident. After injecting 20 cc wait five minutes for disturbances of pulse and respiration, skin flushing, and dilated pupils, which are signs of incompatibility. This also is a complete procedure, which controls bleeding as well as supplies blood, having the advantage of being easy and requiring no rapidity on account of clotting.

A makeshift, when conveniences are not at hand, consists in injecting intramuscularly small quantities of blood or serum to stop hemorrhage, and through a short-beveled needle introduced obliquely one inch below the umbilicus through the peritoneum, run 100 to 150 cc of warm normal solution to combat fluid loss.

If syphilis be responsible, as shown by the presence of positive Wassermann in mother or infant, or by clinical signs, mercurial inunction can be begun immediately by spreading daily 10 grains of blue ointment on waxed paper under the infant's abdominal binder, changing the site at each application. If sepsis shows, naturally stimulants must be employed in conjunction with blood giving.

To conclude, one must not waste time in the treatment of hemorrhagic disease of the new-born, but should be ever ready to make proper use of blood as described.

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The Diagnosis and Treatment of Cerebral Injuries in the New-born

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The tendency of modern medicine is toward the prevention of disease. As we come to realize the results produced by certain lesions, their early diagnosis and immediate treatment are seen to be of vastly more importance than any reparative measures that we may institute after the damage in its full development has become self-evident. In no type of case is this statement more completely borne out than in the injuries to the cerebral cortex in new-born infants. An apparently trifling and almost symptomless mishap to the cerebral cortex occurring during or immediately after birth may carry in its train consequences which will render the child incapable of a normal existence. The early diagnosis and prompt consideration of remedial measures are therefore of prime importance.

The incidence of intracranial hemorrhage in the new-born differs with various observers. Sharpe[1] in examining a series of 1922 cases of cerebral spastic paralysis found that 368 of them gave a history suggesting that they may have had an intracranial hemorrhage at birth. These of course are the cases which had a hemorrhage and still survived. Their condition showed the crippling effects of pressure on the cerebral cortex. Warwick[2] in a series of necropsies in new-born infants found the presence of hemorrhage in 43 to 50 per cent of cases. Holland[3] found hemorrhage in 51 per cent of infants dying as a result of the complications of labor. In one-half of these cases the tentorium cerebelli was torn. This lesion was seen in 88 per cent of necropsies following breech delivery. Brown[4] in 153 autopsies found subdural hemorrhage in 53 cases. In 36 of these cases the hemorrhage was intraventricular. All but one of these fatalities followed forceps delivery. Rupture of the intracranial vessels is ten times as common in breech as in normal deliveries, and all observers unite in the statement that cerebral hemorrhage is an extremely common cause of death in premature infants. Hedren[5] in 700 autopsies found intracranial bleeding in about 10 per cent. In 84 per cent of these cases the middle meningeal artery was involved, an unusually large percentage. In 42 patients the bleeding was above the tentorium in 32, in 10 below, and in 6 above and below. He states that a fractured skull but rarely accompanies this condition.

A realization of the importance of intracranial pressure is the first step in instituting any intelligent method of treating cerebral lesions. It is this factor of an increase of pressure within the skull that more than any other produces the serious consequences with which we have to deal. Normal intracranial pressure depends upon an even balance between the excretion and absorption of the cerebrospinal fluid. This fluid is excreted by the choroid plexus in the lateral ventricles, and passes from these spaces through the foramen of Monroe to the third ventricle, thence through the aqueduct of Sylvius to the fourth ventricle, and the basilar cisterns. The fluid leaves the cistern through foramina of Luschka and Majendie and flows to the subarachnoid space, where it is absorbed into the venous sinuses. Any factor causing a blockage in this channel or any interference with the absorption of the fluid after it reaches the subarachnoid space will cause an increase in intracranial tension. Any encroachment on the normal content of the cranium, by a depressed fracture or hemorrhage, will raise the tension. Engorgement of the cranial veins due to external pressure in the maternal straits is a factor which must be considered in this connection. A rise in venous pressure will cause an immediate and compensatory rise in the pressure of the cerebrospinal fluid, for a rise in venous pressure means that less cerebral fluid is

being absorbed, while the rate of excretion by the choroid plexuses is not decreased. An actual increase in the amount of fluid in the ventricular system results. This increased pressure in turn increases the venous engorgement and thereby decreases the amount of fluid absorbed. Thus a vicious circle is set up, until finally the venous engorgement becomes so great that a delicate vein ruptures and bleeding ensues.

The peculiarities in structure of the infant skull as compared to the adult are significant. In the infant the cranial sutures have not as yet closed, which permits of molding and overlapping of the bones in the process of labor. The longitudinal sinus lies immediately below the sagittal suture and is easily torn by the impinging bones. The veins which lie in the subarachnoid space and pass over to the sinus are extremely thin, and in the last few millimeters of their course unsupported by any surrounding tissue. An increase of venous pressure easily ruptures these delicate vessels, causing hemorrhage and a consequent rise in intracranial tension.

The factor of asphyxia either intrauterine or intrapartum must be considered as a cause of intradural bleeding. In a recent article Schwartz[6] has considered the pathological findings in the brains of 30 children dying of asphyxia following childbirth. In every case the brain showed minute punctate hemorrhages all through its substance in those dying early in the course of the disease, while later areas of necrosis and larger extravasations of blood were noted. These children died a respiratory death, greatly resembling that seen in medullary edema in adults. The heart continues to beat, but the lungs cease to function, and death usually follows from this cause. There is a marked venous congestion in the extremities. All these facts, coupled with a high intracranial tension as demonstrated by a spinal tap, would seem to point to the asphyxia as the starting-point of the condition. The asphyxia causes general venous congestion. This engorges among others the cranial veins, and acute hydrocephalus results, for fluid absorption is impeded. The veins are delicate and rupture; the hemorrhage increases the tension within the skull, and this in turn causes pressure on the medulla, the asphyxia increases, and death ensues. Finally the question of a hemorrhagic diathesis in the child with consequent intracranial bleeding and a rise in pressure must be borne in mind. This hemorrhage has no relation to the severity of the processes of labor, but is an inherent defect in the blood of the child resulting in a greatly lowered coagulation time.

In a recent paper Monroe and Eustis[7] have classified the causes of an increase of intracranial tension in new-born infants into three groups:

1. Traumatic group. Hemorrhage caused by excessive molding of the head and overriding of the sutures, with subsequent tearing of the veins, or in which the application of forceps has caused a depressed fracture of the skull with the production of an increase in tension.

2. Asphyxia group. Hemorrhage caused by excessive cerebral congestion, with rise of intracranial tension and consequent pressure on the medulla and its centers.

3. Fetal disease group. Hemorrhage having no relation to labor, but being due to hemorrhagic disease in the child.

The diagnosis of increased intracranial pressure is made with certainty only with the lumbar puncture needle. There are many suggestive symptoms, but spinal tap plus the estimation of the pressure by means of the mercury manometer is proof positive. In cases in which the increased intracranial tension occurs prior to delivery, there may be difficulty in the onset of postpartum respiration, the pulse will be slow and weak, the fontanelles tense, and the baby will not cry. A marked cyanosis will be noted. In later cases in which the tension does not rise until some time after birth, the child may be apparently normal for a period. Then the baby will become restless, refuses food, and cries in a peculiar shrill manner. The fontanelles become tense and cease to pulsate; the pulse is retarded. Neurological signs due to the

area involved in the hemorrhage may be elicited. It must be remembered that the peripheral signs of intracranial hemorrhage in infants may be almost entirely absent. Loss of reflexes may be of no pathological import, while a positive Babinski is commonly found. Muscle-tonus changes are probably of the most significance. Convulsive movements, spasticity or flaccidity in the face or extremities, ocular palsies or paralysis, or muscular twitchings, are of much more importance in localizing the area involved in the lesion. The presence of icterus with the signs of intracranial pressure is of great value. These jaundice cases bleed from all their mucous surfaces and apparently from the brain as well. The sequence of events in all probability is that a little bleeding is set up due to pressure consequent on the passage through the maternal straits. The hemorrhagic diathesis subsequently prevents the clotting of the blood and the spontaneous checking of the bleeding. The hemorrhage continues from many small points and assumes sufficient proportions to cause symptoms of an increased tension.

Thus in all cases with a history of a severe or precipitant delivery from whatever cause in which the child is restless, cries a great deal, will not nurse, and shows increased tension of the fontanelles, it is the part of wisdom to perform a spinal tap to determine with accuracy the intracranial pressure and the presence or absence of blood cells in the fluid.

The treatment of these three groups of cases is fundamentally the same. It is against the increased tension that all measures of relief must be directed. The prognosis varies with the degree and character of the injury. The traumatic cases offer on the whole the least chance of recovery. The hemorrhage in these cases is commonly diffuse, involving both cortices, often into the ventricles or brain tissue itself. Infants tolerate very badly the formidable operative procedure necessary to deal adequately with a widely distributed clot. It is well-nigh impossible to differentiate with any accuracy between supra- and infratentorial hemorrhage. As a rule in infratentorial bleeding the signs of medullary compression are paramount. The patients are listless. There is a more distinct tendency to cyanosis. The respiration is convulsive, gasping, becoming of the Cheyne-Stokes variety. The pulse is at first full and bounding, later weak and rapid. The fontanelles do not bulge as markedly as they may in supratentorial lesions. Cranial nerve involvement may be more marked. Supratentorial hemorrhage, on the contrary, by the more direct pressure on the cortex, gives rise to muscular twitchings, convulsive seizures, paresis, or paralysis. The convulsive spasms are at times ushered in by a shrill cry. The fontanelles are tense and bulge. As the pressure increases and the medulla is affected, the picture merges into that of infratentorial involvement.

Given a history of a definite trauma the first step should be the determination of the tension by spinal tap. If the pressure is above 18 mm. Hg as shown by the manometer, sufficient fluid should be withdrawn to reduce the tension one-half. If the mercury level lies between 6 (normal) and 18 mm. the fluid should be drained off until the pressure has fallen to normal. If there is no great change in the patient's condition, the tap should be repeated in eight hours and fluid removed under the same conditions. If there is no fall in the tension at this second determination, we feel that a ventricular puncture should be made at once. This is best done through the right lateral arm of the anterior fontanelle. Entrance is gained by way of the fontanelle in order to avoid the necessity of trephining the bone. This may be done readily under local anesthesia. Twenty to twenty-five cc of fluid should be removed. Subtemporal decompression should only be undertaken if all other methods of drainage fail to produce results, or in those cases in which there are very definite diagnostic signs of a clot in the motor area. A general anesthesia should never be used. It is not necessary and adds greatly to the risk of the operation. Local anesthesia is suf-

ficient. A straight muscle-splitting incision is made over the temporal muscle, the bone is entered with a trephine at three points just above the zygoma below, about an inch below the sagittal suture above, and midway between the two. If the dura is seen to be plumb-colored beneath any of these openings the bone is widely removed from this area. If the dura is tense and does not pulsate, it is wise to puncture the ventricle before the dura is opened. In this way the pressure is relieved and the brain does not herniate out and rupture itself on the edges of the dural incision, thus tearing the delicate pial veins on the surface of the cortex. If clots are found they should be removed with extreme gentleness. A drain is then placed through the dura under the temporal lobe and the wound closed in layers.

The mortality from the laying back of an osteoplastic flap is so great in infants that the procedure should not be attempted. Any clot which is so extensive as to require the raising of a flap could not be handled with much chance of success.

A simple depressed fracture, provided it is not accompanied by bleeding, which is often the case, is easily dealt with. A small trephine opening is made in the skull near the depression, a dural separator or grooved director is slid in between the bone and the dura and the bone gently raised up. In the soft thin cranial bones of infants this is easily done and the bone remains in place.

The asphyxia group of cases presents a history of a protracted compressive labor rather than one in which a trauma might have occurred. The signs of medullary compression may be more pronounced. The prognosis depends on the length of time that the compression has existed before steps were taken to relieve it. The treatment is the same. The presence of an increased tension is determined by tapping and manometer readings. Fluid is withdrawn in sufficient quantity to reduce this pressure, the puncture being repeated in eight hours. Ventricular puncture and finally decompression and drainage are resorted to if the clinical picture does not improve.

A determination of the clotting time of the blood must be made in all cases. A subicteric tinge of the skin or conjunctiva or a frank jaundice will make the diagnosis of icterus neonatorum. An increased clotting time will confirm the presence of a hemorrhagic diathesis. The coagulation time of the blood should be brought to normal as rapidly as possible by the subcutaneous injection of whole blood or blood-serum. Only after the blood-clotting time has returned to normal should any attempt be made to treat the intracranial hypertension. Lumbar puncture confirms the presence of increased pressure; the methods outlined, repeated spinal drainage, ventricular puncture, with subtemporal decompression as a last resort, may be employed to combat it.

The following factors then are of importance in the diagnosis of intracranial hemorrhage in infants: A detailed history of the type of labor to furnish an impression of the degree and character of the injury; a careful physical examination to determine if possible the location of the clot; an estimation of the clotting time of the blood; and finally, most important of all, accurate information as to the amount of spinal tension by means of lumbar puncture and manometer readings. It is only on the basis of these facts that rational treatment for the relief of the increased intracranial pressure may be instituted.

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The Treatment of Infantile Syphilis

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As in the consideration of all similar, or dissimilar, conditions of disease, attention should be given primarily to prevention; and this is true more emphatically of syphilis than of any other disease to which the infant is hereditarily, or otherwise, subject.

A priori, marriage of syphilitics should not be permitted, or, at least, until these persons have undergone a course of treatment of such duration as to insure reasonable safety to their offspring.

Pregnancy, however, having occurred under conditions favorable, or suspiciously favorable, to positive syphilitic diagnosis, the woman should be given antisyphilitic treatment, even though she gives a negative Wassermann. This precaution gives almost positive assurance that the child will be born without the disease, and, conditions being not otherwise unfavorable, continue without evidence of it. This treatment is with arsphenamine, or neoarsphenamine, and mercury.

If the parents are known to be syphilitic, though no treatment has been given during the period from conception to the birth of the infant, it is wise to commence with syphilitic treatment within a week of the infant's birth. There is no better form of mercury than that of the ointment: 50 per cent strength is better than the less concentrated form as it will not have to be applied more frequently than twice weekly. In using the inunction it is important to cleanse the skin surface thoroughly with soap and warm water, this assisting in the absorption of the mercury. It is also advisable to rub the ointment in very thoroughly, the nurse or mother using a rubber glove for this purpose, and a different place being selected for each application: the abdomen, axillæ and groins being the sites of preference. The dose should be fifteen grains, or a mass slightly larger than a pea. The only objection to the inunction is the color of the ointment and resulting staining of the clothing; further, that there is rather common knowledge among the laity of what is indicated by the use of this ointment. Calomel ointment may be used in place of this, but as its absorption is slower and not so effective, it must be applied each day for a month or six weeks, to be followed by a rest period of two weeks before returning to the treatment. The oleate of mercury in 10-per-cent solution may be used, rubbing in five drops three times daily.

The oral administration of mercury should also be given from the earliest possible moment after the birth of the infant. When the case is not known or even suspected to be syphilis, the earliest manifestations will show within the first six weeks of postnatal life, as snuffles, more or less irregular blotches appearing in the skin, rhagades and moist or dry condylomatous thickening about the anus. Gray powder is then given in the dose of from ⅛ to ½ of a grain three times daily, depending upon the age and weight of the baby. If this causes pain and diarrhea, Dover's powder in from 1/20 to 1/12 of a grain should be combined with it. Calomel, to my mind, is a better form to use, as it is more rapidly absorbed, and continues to be eliminated for a considerable period of time. It is well to begin with 1/20 of a grain two or three times daily, increasing to 1/10 grain by the time the infant is six months of age. Further, it is better borne by the majority of infants than gray powder or other preparations of mercury, provided that the calomel is pure—*i. e.,* washed so thoroughly that no free mercury remains in it, for it is this free mercury in the calomel which causes gastroenteritis in babies who have been upon a long course of treatment. Bichloride of mercury in the dose of 1/200 to 1/60 of a grain should be given two or three times daily. If it causes any irrita-

tion to the gastrointestinal tract it can be given combined with pepsin or milk of bismuth.

No mercury treatment should be continued for a longer period than six weeks, followed by a rest period of from ten days to two weeks, and no course of treatment in infancy should be discontinued under two years. Frequently physicians do not stress this enough to the parents, and as the symptoms subside they relax their care or give up the treatment entirely, with exceedingly bad results to the health of the child in later years. It is not possible to lay too much stress upon this fact.

When rapid action is needed hypodermic injections of bichloride of mercury, 1/200 to 1/100 of a grain in 1 cc of distilled water, should be given every other day into the anterior muscles of the thigh, the triceps, or gluteus muscles. The former muscles are preferred as the infant can lie on its back without pain, and there is less chance for the formation of abscess. If after three weeks of this treatment there is not much improvement, it should be given for another three weeks, after the two weeks of rest have passed; however, if there has been a considerable change for the better, it is well to continue the mercury either by mouth or inunction.

The intravenous treatment of infants with arsphenamine, neoarsphenamine, or any of the other arsenical preparations is a moderately difficult procedure for any one not thoroughly acquainted with its administration, and, further, it is exceedingly difficult in many babies to find a vein. The veins best suited to this purpose are at the bend of the elbow (median basilic or median cephalic), the external jugular, or any of the veins of the scalp. It is not wise to use the longitudinal sinus. Frequently it is necessary to cut down upon the vein before it is possible to enter it. Treatment should be given weekly over a period of six weeks and this followed by mercury over two periods of a month each. Neoarsphenamine is the best form to use as there is less danger of bad results. The dose of arsphenamine is one decigramme for a baby weighing fifteen pounds. Neoarsphenamine can be given intramuscularly with little danger of the production of an abscess.

Local lesions about the mouth or buttocks should be treated by powders or lotions, calomel, or calomel and boric acid, being the best of the powders to use. A calamine lotion combined with ten to fifteen grains of ammoniated mercury is very effective for ulceration about the nates or elsewhere. If it can be kept in place it is well to saturate a small compress and let it be held in place by the folds of the skin. If this cannot be done it should be applied from three to six times daily. When there is crust formation, an ointment of ammoniated mercury will be of more use in softening and removing the crusts, after which the lotion may be applied.

Thyroid extract in 1/10-grain dose will be found of much benefit if given during the rest periods.

No part of the treatment of the syphilitic infant is of more importance than the hygienic and dietetic, for without strict attention to these, drugs will in many cases be of little avail. Fresh air and sunshine are of great importance, while care of the body, in the way of bathing, followed by oil rubs, will be of assistance in keeping the baby in better condition. The feeding must be carefully watched, and whenever possible it must be from the breast, as all of these infants show a greater or less degree of malnutrition, and breast milk is the best food for this condition. Where it is impossible for the mother to nurse her infant breast milk must be obtained in some other way, and the preference is from a healthy wet-nurse, but as the baby may infect the nurse by nursing from her, the milk will have to be expressed by a breast pump or massaged and fed from a bottle. If both of these fail we must resort to artificial feeding, and here the greatest difficulty will be encountered, for it is often hard to find a mixture that will be tolerated by these infants. A preparation of the vitamins added to the feeding will at times prove beneficial. Cod-liver oil in small doses, five to ten minims, is good if well borne, and iron in one form or another is always indicated.

Feeding the New-born Infant

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Until the middle of the eighteenth century breast feeding was the accepted and prevailing form of infant feeding, the exceptions being so rare that the provision for a necessary substitute was left to the discretion of the mother or nurse. The prevalence of artificial feeding in modern times must be regarded as one of the evils of advanced civilization. But the situation is a very hopeful one; already the pendulum is swinging the other way, for more and more the difficulties of breast feeding are being understood and overcome. When maternal nursing becomes universal, the problem of feeding the new-born will be reduced to a minimum.

The food provided by nature is preëminently suited to the digestive needs of the infant beyond anything that man can devise.[1] It is always available, automatically produced, and safe from the bacteria which so largely abound in any form of artificial food, due to the absence of handling in its production, and direct method of intake. Our views are fully confirmed by mortality and morbidity statistics, which furnish conclusive evidence of the superiority of natural over artificial feeding. In the city of Philadelphia during 1915, 1168 babies under one year of age died from diarrheal diseases, and eight out of every ten were bottle-fed. Of 1000 children studied by Armstrong, but 8.4 per cent of those wholly breast-fed died in the first year. In Philadelphia in 1917, of 4617 babies who died, 1800 were in the first year of life. Many of these would have lived had they been nursed by their mothers, for breast-fed babies rarely contract diarrheal or contagious diseases, and when they do, their chances of recovery are many times greater. It has been shown that breast-fed children exhibit a bactericidal power greater than that of the artificially fed.[2] Specific agglutinins are probably transmitted to the child through the mother's milk.[3, 2]

Another advantage which the natural method of feeding has over the artificial is that of economy. To many families the present high cost of milk and its products is prohibitive, and the necessity of buying milk for the new baby is a financial burden. Furthermore, many mothers are unable mentally to cope with the intricacies of milk modification, and an unsuitable and poorly prepared mixture is inevitable.

Much thought and scientific study has been devoted in the past to devising new and exact methods of artificial feeding, which might better have been expended in overcoming the difficulties of breast feeding; for with few exceptions every mother can nurse her baby if she so desires.[4, 5, 6] Drs. Cooley and Cope,[7] in a study of breast-feeding possibilities in a small industrial community, succeeded in getting 96 per cent of breast feeding at the end of one month, and 83 per cent at the end of six months. Recent statistics from the University of Minnesota duplicate these figures.[8] In a study made at Starr Centre last year, which comprised 457 mothers cared for by the prenatal department, 449 or 99 per cent were nursing their babies at the age of one month.

A very definite increase in the prevalence of breast feeding has been noticed universally during the past ten years, and is due entirely to the education of the public and the physician to the vital importance of the subject. Perhaps the greatest factor in obtaining the coöperation of mothers has been the prenatal clinic. Not only because of her improved physical condition resulting from care and hygiene during pregnancy, but because of the distinct psychological advantage in having the mother's confidence, she can be prepared mentally as well as physically for the duty of nursing. Prenatal care bears such an important relation to successful maternal nursing that a brief consideration of this subject may prove helpful.

The health and habits of the expectant mother should be carefully supervised by her physician. Faulty habits of dressing, an easily disorganized nervous system, and social life with late hours have been responsible for the loss of many infant lives.[5] A simple and nutritious diet, strict attention to hygiene, moderate exercise in the open air, and proper rest contribute largely to successful breast feeding. Added to these there should be routine blood-pressure readings, urine analyses, and immediate attention given to any of the danger-signals of pregnancy. Suitable measures should be instituted to correct inverted nipples and to prevent the occurrence of fissures which may temporarily interfere with nursing.

Unless contraindicated the infant should be put to the breast for a brief period within a reasonable time after delivery. This should be repeated every four hours until the appearance of the milk supply, when the interval should be shortened to three hours for fifteen- or twenty-minute periods.

At this time there is present in the breast only the colostrum, which is believed by Prichard[9] to serve the purpose of developing the infant's digestion. To avoid the loss of weight[10] due to the small amount of nourishment the baby thus receives,[11, 12] many well-known pediatrists have attempted supplemental feeding,[11] but this has proved unsuccessful.[1, 13] Excepting for the frequent administration of water, I do not believe it wise to attempt any form of supplemental feeding at this time, but rather to regard this loss of weight as the inevitable result of nature's adjustment. Giving condensed milk, lactose solution, sweetened cow's milk, or dried milk mixtures[14] only serves to distract the baby's attention from its true source of nourishment. Additional food provided by a wet-nurse has been equally unsuccessful at this period.[13]

Successful breast feeding depends largely upon certain well-defined factors, viz.:

1. Stated nursing periods at regular intervals, varying according to the anatomic and digestive capacity of the baby.

2. Careful attention to the hygiene and habits of the baby.

3. Regulation of the hygiene, habits and diet of the mother.

Until three months of age the baby should be nursed regularly every three hours during the day and once at night, using each breast alternately, unless a scanty supply necessitates the use of both breasts at each feeding. The normal baby should nurse for fifteen or twenty minutes and should not be permitted to sleep during the nursing period. Feeble infants nurse more slowly and tire more easily. Strong babies nurse more vigorously and for a shorter period. As a general rule, my experience has shown it to be expedient to adhere to the three-hour interval; for while a baby often thrives on a four-hour interval where the milk supply is plentiful, and the baby normal and vigorous, the gain is apt to be retarded in the later months. Premature and weak babies unquestionably require more frequent nursing. Then, too, the breast with a scanty supply requires more frequent stimulation, for the milk supply is in direct proportion to the demands upon it.[15] Complete emptying of the breasts will greatly aid in the maintenance of the milk supply, and absolute regularity in nursing should be strictly adhered to from birth. If asleep, the baby should be awakened at the regular feeding time during the day, but during the night should be fed but once.

Boiled water should be given freely between nursings, a young baby requiring from four to six ounces daily. Loud noises and rough handling should be avoided, and the diaper changed as often as necessary to keep the baby comfortable. One bowel movement a day is essential to health.

The third factor contributing to successful breast feeding is the well-being of the mother.[16] Her diet is most important.[17] While in bed following delivery it should be light, easily digested and assimilated, and she should have not more than four meals a day. After the establishment of the milk supply a more liberal diet includ-

ing meat and vegetables is essential. Green vegetables, fruit and bran bread are helpful additions to her diet. One quart of milk and at least one quart of water should be taken daily. The use of alcoholic beverages either as stimulants or as galactagogues is not only useless but harmful. Moderate exercise in the open air, sufficient unbroken sleep, and time for diversion free from the care of the baby are valuable in maintaining the health and strength of the nursing mother, and in soothing an overwrought and high-strung nervous condition. The baby should sleep alone, preferably in a separate room, and the night feeding be eliminated as soon as possible.

The life of the nursing mother should be free from excitement and worry, as any emotional disturbance may cause temporary lessening of the supply, while anger or fright may render the milk unfit for the baby.

The normal breast-fed baby will gain from four to eight ounces a week, and this progress should be definitely recorded by a weekly weighing. Conclusions should not be drawn from one or two weighings, however, as the gain is apt to be irregular. A young infant should sleep most of the day and night. It should be contented and satisfied after nursing and there should be practically no spitting up. Occasionally an infant nurses too fast, causing the formation of gas, or too long, thereby overloading the stomach; these conditions are relieved by eructation, which should not be confused with the spitting up or vomiting from more serious causes. The healthy breast-fed infant should have one to four stools daily, of orange-yellow color, soft, sour odor, and acid in reaction.[18]

In spite of our firm contention that maternal nursing is the ideal method of feeding the new-born, it must be conceded that frequently cases are met which severely try the skill and patience of both physician and mother.

The new-born normally should be able to suck. Inability to do so finds its explanation in a deformed or undeveloped nipple or in local or pathologic conditions in the infant.[19] There may be present malformations, as harelip or cleft palate, sublingual swelling, ulcers, or a short frenum. All these demand appropriate treatment or surgical attention. In the meantime a special nipple is obtainable for harelip and cleft palate.

The prominent symptoms that confront us in disturbed digestion in the early weeks of life are regurgitation, vomiting, colic, undigested bowel movements, and the one which gives the mother the greatest concern and is the surest index of the baby's condition to the doctor, viz., failure to gain or actual loss of weight. All these symptoms require investigation to ascertain the exact cause of the disturbance. A chemical examination of the breast milk at the outset will often aid in detecting the source of trouble.

As a general rule, no infant should be weaned until its mother's milk has been definitely proved harmful[20, 21] or its composition extremely abnormal. Many infants are born with digestive capacities which vary greatly from the normal. Similarly the composition of the milk of different nursing mothers varies to a great degree,[21] and the problem of breast feeding is reduced to that of fitting the individual mother's milk to her respective baby's digestive capacity.

Underfeeding is usually indicated by an unsatisfied condition of the baby, restlessness, crying before nursing period, because of the inability to get sufficient milk or as rapidly as desired. These symptoms are associated with small brownish or brownish-green stools with mucus.[22] Under such conditions the baby should be weighed upon a beam scale before and after nursing, and the gain in weight accurately noted. It is also well to determine the total weighings for a 24-hour period, in order to estimate the caloric intake, which in the new-born should be 100 to 120 calories per kilogramme of body weight.[23, 24] A very young baby should gain 13.0 gm. to 54.9 gm. at each nursing.[10] The best dietary stimu-

lants for the mother of an underfed infant are milk, cocoa, water, and gruels. Fats are increased by feeding with fats; carbohydrates, by limiting exercise in the mother.

It is most important to know just when and how breast milk shall be supplemented. Unquestionably the best method is to supply the additional food needed as a complemental feeding. The amount of food obtained from the mother, as ascertained by weighing before and after nursing, should be complemented by a sufficient quantity of an appropriate artificial feeding to supply the infant with its physiological and caloric needs. The custom of giving the breast or bottle feeding alternately very quickly results in the disappearance of the breast milk because of decreased stimulation to the glands and consequent cessation of function.

The tendency of most mothers, unless controlled, is to nurse the baby too frequently and for too long a period. The overfed baby may gain large amounts at first, but later ceases to gain, or actually loses weight. Overfeeding results in colic, regurgitation, polyuria, eczematous eruptions, accompanied by large, sour, bulky stools, and if sugar be excessive, redness and excoriation of the buttocks.[9]

Excessive fat in the milk may result in sour vomiting with an odor of butyric acid.[26] When there is an excessive fat intake or an inability on the part of the baby's digestion to properly handle the ingested amount, the condition is manifested in the stools in three distinct types:[2] (1) soap stool, (2) fatty stool, (3) curdy stool. In a general way, high fat is reduced by limiting fats in the diet of the mother and increasing the amount of exercise. The breast milk may be diluted by giving the infant water previous to nursing.

Protein rarely causes disturbance in breast-fed infants, probably because of the large amount of lactalbumin and small amount of hydrochloric acid in the infant's stomach, permitting the milk to pass almost immediately into the intestines.[27] However, excessive amounts of protein may cause colic, the stools being alkaline in reaction, brownish yellow, and of putrefactive odor. Occasionally tough yellowish protein curds are found. The amount of protein in the mother's diet should be limited, open-air exercise increased, and fatigue, worry and nervousness avoided as far as possible.

Milk rich in protein and low in fat is usually found in nervous, overworked, underfed mothers burdened with cares and anxiety.[2] The babies suffer from vomiting, colic, and loose offensive stools. The correction of these cases becomes a difficult problem, but breast feeding should be persisted in unless the condition of the baby is steadily downward.

Occasionally cases occur in which both fat and protein are present in large amounts, to which the infant's digestion is unequal.[22] Such a condition occurs in overfed mothers who take insufficient exercise. Dietetic and hygienic measures on the part of the mother are usually sufficient to overcome this difficulty.

Excessive sugar is rare, but if present may cause watery vomit with irritating watery or frothy bowel movements, sometimes green in color, which excoriate the skin of the buttocks and thighs.[28] If these symptoms are present, the mother's diet should be reduced in quantity, excess sugar omitted, and exercise in the open air prescribed.

The exact cause of colic in breast-fed infants has not been definitely determined. Its occurrence is usually attributed to overfeeding or an excessive amount of fat in the milk. The condition usually appears at the same time each day, generally in the late afternoon or evening, possibly as an accumulation of the day's feedings. Colic may be induced by a milk unsuited to the baby's digestion and frequently occurs where the mother is high-strung and temperamental. The attack is in the nature of flatulence, attended with eructations of gas or vomiting, the passage of flatus, and accompanied by diarrhea or constipation. The symptoms are vigorous crying, a hard, distended abdomen, knees drawn up, extremities cold, ac-

companied by cyanosis and symptoms of shock due to pain.

At the onset of the attack the baby should be placed over the shoulder and the back patted to encourage the eructation of gas. Hot soda mint or fennel tea may be given and hot spice bags applied to the abdomen. If the attack persists the use of a soap stick or small enema is advisable. If the colic is due to overfeeding, the nursing period should be shortened, the interval lengthend, and water given before nursing. Giving an alkali, such as bicarbonate of soda or milk of magnesia, before nursing is sometimes of advantage. In the management of colic in the breast-fed infant, it is important to restrict the mother's diet, omitting rich or highly seasoned food, sweets, pastry, and acid fruits. Green vegetables, a moderate amount of water, and exercise in the open air will be found advantageous. Babies with colic frequently gain normally.

The weak or premature baby, because of its inability to suck vigorously, requires special management.[29] The baby should be disturbed as little as possible and is best fed expressed milk (expressed by hand), either by means of a dropper, breck-feeder, or tube. At first, according to the degree of prematurity, it is best to dilute the breast milk and feed in small amounts, viz., two to four drachms every hour, increasing the amount as the interval is decreased. Occasionally infants persistently refuse to nurse when placed at the breast. This is usually the result of prolonged or difficult labor and is only of temporary duration. Acute illness is frequently a cause for refusal to nurse, particularly in acute coryza, when the baby finds it difficult to breathe and nurse at the same time. This period should be tided over by the feeding of expressed milk.

Various excuses are given by mothers for failure to nurse their babies. Most of these could be eliminated by proper mental training during pregnancy, for many apparent contraindications to maternal nursing are only minor difficulties which will usually succumb to a little tact and management. Intercurrent disease of a transient nature in the mother is not sufficient cause for weaning the baby. In such a case the infant may be fed on a substitute mixture, measures being taken to retain the mother's milk supply by complete emptying of both breasts at regular intervals. Temporary inability from the complications of labor should be dealt with in the same way.

Only after persistent efforts at maintaining the milk supply of the mother and modifying it in every possible manner to fit the infant's digestion, and there is still failure to gain or an actual loss of weight in the infant, should maternal nursing be discontinued. Occasionally in spite of complete coöperation on the part of the mother it is found impossible to keep the milk supply. In such instances galactagogues of any nature have proved worthless. Any serious organic or systemic condition in the mother, viz., tuberculosis,[30] chronic heart or kidney disease, typhoid fever, rheumatism, septicemia, or contagious disease, contraindicate breast feeding.

If weaning becomes necessary a wet-nurse is the next best choice. When a wet-nurse can be obtained, it is preferable that her baby be near the age of the baby to be nursed and the supply abundant, so that she may nurse her own baby, too. The general appearance of the wet-nurse and her child should be considered; she should receive a complete physical examination and be free from any transmissible disease, especially tuberculosis, gonorrhea, and syphilis. If a wet-nurse prove impracticable, artificial feeding is the only alternative.

ARTIFICIAL FEEDING.

No method of artificial feeding can perfectly replace maternal nursing; however, the different constituents of the substitute milk should resemble as nearly as possible those of mother's milk both in their chemical composition and in their behavior to the digestive fluids. These conditions are fulfilled only by the fresh milk from some other animal. Cow's milk, for practical

reasons, has been found to be the one best suited for the purpose. Goat's milk[2] and asses' milk more nearly approach the physical and chemical character of human milk, but these are not available in sufficient amounts to render them of any practical value. The elements of a substitute for human milk must be properly proportioned for the body needs of the infant, the food adjusted to its digestive powers, and free from bacteria and other poisons.

In chemical composition cow's milk conforms to human milk somewhat as follows:

Fat 4 per cent as compared to 3½-5 per cent in breast milk.
Protein 3½ per cent as compared to 1½ per cent in breast milk.
Sugar 4 per cent as compared to 7 per cent in breast milk.

The chief differences lie in the character of the fat, protein, and salts. It has been definitely established that fat plays an important part in the nutritional disturbances of the artificially fed infant. The fat globules are much larger than those of human milk and the butter prepared from cow's milk contains 10 per cent of volatile acid, while that prepared from human milk but 1½ per cent.[31]

As to the protein, breast milk contains small amounts of casein and soluble calcium with relatively large amounts of sodium and potassium; while cow's milk contains large amounts of casein and soluble calcium, with relatively small amounts of potassium and sodium.[32] Lactalbumin is present in breast milk in about twice the quantity of that in cow's milk.[2] The presence of this larger amount of lactalbumin with sodium and potassium is responsible for the finer curd in the process of digestion by the formation of potassium or sodium caseinate.[32] Reversely, the curd from cow's milk is tougher and occurs in larger masses than in human milk, thereby throwing extra work on the infant's digestion.

The new-born infant requires 100 to 120 calories per kilogramme of body weight every 24 hours.[33, 11]

Forty-seven per cent of the calories of both breast milk and cow's milk is in the form of fat, of which about 90 per cent is absorbed.[34] The marked difference in the digestibility of the two fats is probably due to the much greater proportion of volatile fatty acids in cow's milk.

Tolerance to the fat of cow's milk varies greatly. Intolerance, when once established, is very persistent. Therefore, the fat percentages should be kept low in the early weeks of life.

The average protein need of an infant is estimated to be from 0.7 to 0.9 gramme per kilo of body weight daily.[34] The amount of protein required by the infant fed on cow's milk is greater than that required by the infant fed on breast milk, the explanation being the deficiency in the casein of cow's milk of certain amino acids which are furnished abundantly by the albumen of breast milk.

Holt[35] regards 1½ ounces of whole milk per pound of body weight as providing the required amount of protein.

Inasmuch as the curd formed from cow's milk is so difficult of digestion, it is possible to render it more easily digested by dilution, boiling, by adding cereal diluent or alkali, such as lime water, citrate of soda, soda bicarbonate, or milk of magnesia.

Carbohydrate is very necessary to life,[28] and if eliminated from the diet, acidosis results. It has been recently determined that carbohydrate can be substituted for fat in the food.[28] Also, if largely included in the diet, less protein is needed.[28]

Carbohydrates used in artificial feeding are lactose, saccharose, maltose, and dextrose; the latter, being assimilated more easily, is most valuable in intestinal disturbances.

A cow's milk formula should provide for the estimated caloric requirements of the infant, maintain if possible the proper balance between the various elements, contain the necessary salts in sufficient quantities, and be free from bacteria.

Many methods have been suggested for calculating formulæ and tables compiled to meet the food requirements for the infant at various ages. These tables are often misleading, and many physicians attempt

to fit the baby to the table without regard to the digestive idiosyncrasies of the infant.

Milk used for artificial feeding should be produced under the best possible conditions from tuberculin-tested cattle. From the time it is drawn from the cow, it should be kept in a covered receptacle, preferably the original container, at a temperature not exceeding 50° F. It is generally accepted that tuberculosis in early life results in most instances from the use of milk containing tubercle bacilli.

Whenever the financial status of the patient will permit, certified milk should be used, as this is the only raw milk on the market which is practically safe. Special emphasis should be laid upon the care of the milk in the home to keep it safe, and the physician should teach and insist upon careful handling in the process of modification.

Cow's milk should always either be brought to the boiling point, boiled, or pasteurized before giving to the baby. Heating milk results in the destruction of important vitamins, and the consequent development of scurvy. It is important, therefore, to administer to the infant some form of fresh fruit juice. Those in most general use are orange or tomato juice, and recently egg-yolk[36, 37] has been suggested. Each of these should be given at first in small quantities, increasing gradually.

It would be impossible to attempt to discuss all the difficulties of artificial feeding. Every baby's metabolism and digestion is an individual problem, and each case requires study to determine the formula, interval, and nursing period best suited to its needs.

The quantity given at birth should be ½ to 2 ounces, increasing gradually according to age. In feeding the infant with normal digestion, all the elements should be increased gradually, depending upon the completeness of digestion, gain in weight, and perhaps signs of hunger in the baby.[22] In general the quantity given should be according to age:

2½ ozs. at 1 month.
3 to 3½ ozs. at 2 months.
4 to 4½ ozs. at 3 months.

The same routine applies as for maternal nursing.

During the first few weeks of life cow's milk should be greatly diluted with water, boiled, and contain less sugar than for older infants. The first formula should not exceed one-fifth to one-fourth of whole cow's milk, and be gradually strengthened as the infant's digestion becomes adjusted to this form of food. While such a formula does not at first meet the caloric requirements of the infant, it is of far greater importance to build up the digestive apparatus than to overemphasize gain in weight.

To meet the increasing need of the infant for fat, the mixture may be steadily strengthened by dipping top milk after the cream layer has formed. The first formula given is prepared from whole milk which contains 4 per cent fat. This should be used for one week. The second week the formula is prepared from the top 28 ounces, which contains approximately 4½ per cent fat. Each week thereafter the formula is prepared successively from 24 ounces, 20 ounces, 16 ounces, and 10 ounces of top milk, which contains respectively 5, 6, 8, and 10 per cent fat, while the protein and sugar remain fairly constant.

The carbohydrate must be increased by some form of sugar to bring this element up to 6 per cent. It is best never to use more than 6 per cent of any one form of carbohydrate.

In some instances an intolerance may exist in the infant for the protein of either breast or cow's milk. Where this is present even small amounts which may pass unaltered into the circulation cause alarming symptoms of anaphylaxis.[40, 39, 2] Cases have been reported in which subcutaneous injections of small doses of the protein at fault have cured the underlying conditions.[38, 39, 20]

It is occasionally of advantage where cow's milk is not perfectly digested, as evidenced by pain, eructations, vomiting, and undigested bowel movements, to peptonize the mixture.

The difficulties met in the artificial feed-

ing of infants are many, and as yet little understood. There are certain symptoms, however, which may be briefly considered.

Vomiting may be due to indigestion from any one of the three food elements, most often fat or casein.[22] Sour vomiting during the feeding interval points to fat. This may usually be remedied by feeding a low fat or a whey mixture, which contains a negligible percentage of fat and an alkali added. If protein is the disturbing element an effort to facilitate protein digestion should be made, such as boiling the mixture, or the use of lactic acid milk.

For some time past cereal gruel feeding has been recommended for pylorospasm and cases of persistent vomiting.[41] The gruel used is preferably farina, 3 to 4 tablespoonfuls to a 20-ounce mixture, thoroughly cooked, and fed to the baby before its breast feeding or formula. It has proven of considerable value in pylorospasm, eczema, constipation, and vomiting, when given in addition to the regular feeding. The stools should be watched for the presence of undigested starch.

Green stools usually occur as a result of fat or carbohydrate indigestion. In such cases the fat and sugar should be given in low percentages and gradually increased. Dextri maltose is the preferable sugar to employ.

Intelligent infant feeding presupposes on the part of the physician a complete understanding of the individual baby and a definite knowledge of cow's milk and its products. I believe that many infant lives have been sacrificed in the present frenzied search for some novel substitute, and the attempt to adjust the baby's digestion to an unsuitable food.

In infants with very weak digestion, whey, or whey with small amounts of cream added, will be well tolerated. It is contraindicated in acute diarrheas or indigestion associated with green stools. Buttermilk is serviceable for short periods in types of digestive disturbances associated with loose bowels, malnutrition, and low fat tolerance. If used, it should be prepared at home daily from a fresh culture.

The various concoctions suggested in the literature, difficult of understanding, and impossible of uniform preparation, attempt to meet indications where cow's milk modifications presumably fail. It is doubtless true that any one of them will occasionally find an infant's digestion which is suited to its digestibility. Certain it is, however, that these can never accomplish more than intelligent feeding with simpler methods, and that none of them are of value for routine administration.

Certain special indications are ascribed to them which will be considered briefly.

Casein milk[2] (Eiweiss milk, albumen milk, protein milk) consists of a casein preparation, the principal purpose of which is to furnish a diet with a fair amount of fat, a low percentage of sugar, a reduced percentage of salts and lactalbumen, with a larger amount of casein. "Its formula is based on the belief that the sugar and salts of the food are the most dangerous elements in many diseased conditions."[2] Preparation is difficult, and, because of inaccuracy in composition, impractical. Recently efforts have been made to supply stock protein, casein, and albumen milk. These are open to the same objection as any of the canned artificial foods.

Lactic acid milk is founded upon the theory that fermentation and putrefaction in the intestines may be materially reduced in the presence of the lactic acid bacilli. As prepared it contains a low fat, low sugar, and high protein, and is considered of value in diarrheal diseases and intestinal indigestion. Lactic acid milk should be tried in cases of fat indigestion when the usual treatment of low fat, high protein, and maltose is not successful, and in severe carbohydrate indigestion.

Johannes Schödel,[42] after use in fifteen cases over a period of three years, regards the use of butter flour of value only in rare cases. Owing to the high fat presence in the suggested Czerny-Kleinschmidt mixture, with the added difficulty in preparation, it should not be considered in feeding the new-born infant.

The value of malt soup[2] is supposed to lie

in the fact that there is present unconverted starch with maltose and dextrin. In the young infant it is of extremely doubtful value.

Proprietary "foods" contain no milk, but consist largely of sugar and starch. These are not in the strict sense foods, and should never be used as such, and milk must always be added to meet nutritional needs. Their use frequently results in poor resistance, rickets, and scurvy.

Dried milk should be used with caution and only in an emergency, such as traveling, or when fresh cow's milk is not obtainable.

More recently there has been proposed such preparations as homogenized olive oil,[22] Shick's milk,[44] Dubo milk,[44] S. M. A.[43] Nothing concerning these has appeared in the literature to lead us to believe for a moment that they have any other than a commercial value.

Condensed and evaporated milks are illogical because of the impossibility of giving sufficient quantity without excessive sugar. Their exclusive use is also followed by malnutrition, poor resistance, and scurvy.

CONCLUSIONS.

1. Breast milk is the only safe and sane food for the new-born.

2. The new-born baby needs no other nutriment than that which it receives from its mother's breast.

3. With intelligent management 99 per cent of babies can be breast-fed through the early months of life.

4. Fresh cow's milk, modified, is the only plausible substitute for human milk.

5. If the new-born baby is properly started from birth on a modified milk formula sufficiently low in fat, the necessity for the later use of various concoctions will be eliminated.

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Diagnosis and Treatment of Incipient Tuberculosis in Children[1]

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Our knowledge of tuberculosis has undergone radical changes during the past twenty years. Chiefly as a result of the extensive use of the tuberculin skin test (Von Pirquet) we have been forced to a realization that, in a large percentage of cases, tuberculous infection of human beings, at least in the cities, has its inception before puberty is reached. The results of the Von Pirquet and other tests show very conclusively a steady increase from year to year up till that age, reaching from 50 to 95 per cent, according to different authors. It must be remembered, however, that a positive tuberculin reaction means only that an infection has occurred, not necessarily that the infection has resulted in a clinical form of the disease.

When we turn to the figures for morbidity and mortality a very remarkable situation presents. For example, among 3100 admissions to the Infants' Hospital, Boston, Dunn reports that 12 per cent were diagnosed as tuberculosis, and in 9 per cent the diagnosis was definitely confirmed. Among 661 consecutive autopsies 20 per cent disclosed tuberculous lesions, chiefly in the form of disseminated tuberculosis with or without meningitis.

All of these instances occurred in the first two years of life. After three years tuberculosis as a cause of death rapidly falls to a comparatively insignificant place, to remain there throughout childhood. For example, the records at the Children's Hospital, Philadelphia, for the last six years show 3100 admissions to the medical wards of children of all ages. Of these 1.84 per cent were diagnosed tuberculous in one form or another, and in 74 per cent the diagnosis was definitely confirmed either by autopsy, the finding of tubercle bacilli, or by the occurrence of some typical lesion such as a tuberculous cervical adenitis. In 79 consecutive autopsies 22.7 per cent of children under two years showed tuberculous lesions, while 10.1 per cent over two years were tuberculous.

Outside of hospitals, accurate figures for morbidity are impossible to obtain, owing to the difficulty in accepting as positive a diagnosis which is not based on the results of autopsy or the finding of tubercle bacilli.

Even allowing great latitude in the interpretation, one of two conclusions is perfectly obvious: either most tuberculous infections after the third year of childhood cause no symptoms whatever, or else they produce mild forms of the disease which, whether the diagnosis is suspected or not, nevertheless recover spontaneously—*i. e.*, without any specific attempt having been made to bring about that result. From either conclusion we might infer that intensive effort to diagnose a malady which will recover unrecognized would be wasted.

There seems to be a tendency of late to adopt the view that childhood infection is almost inevitable, at least among city-bred children, that the infection rarely results fatally after the third or fourth year, and, on the contrary, that the healed focus actually protects against subsequent reinfection much in the way that one attack of mumps renders an individual immune to that disease. Much the greater stress is being laid simply upon under-nutrition, and the nutrition clinic has become established upon a general basis rather than as a special means for combating tuberculosis. In other words, it seems as though familiarity were beginning to breed contempt for tuberculous infection *per se*. If the unreasonable fear of infection is being modified, an immense amount of unnecessary worry undoubtedly will be saved. That there is some danger of the pendulum swinging, as it often does, to

[1]Read before the Geneva Medical Society, Geneva, N. Y.

the other extreme seems to be a possibility. By the same token, the conclusion that diagnosis of obscure and mild tuberculosis is wasted effort is pernicious and speaks rather for inertia than a proper comprehension of the problems involved.

We may review very briefly some of the salient points about tuberculosis in early life before considering the question of diagnosis.

The bovine type of tubercle bacillus is of much greater importance in the etiology of tuberculosis in early life than in adults, and produces chiefly the types of the disease from which children are prone to suffer. A very large percentage of cases of tuberculous adenitis has been found to be due to the bovine bacillus, but general tuberculosis with or without meningitis, and abdominal tuberculosis, especially under five years of age, likewise show a considerable proportion of cases which harbor the bovine bacillus.

In most of the large cities in the United States for the past five years or more practically all the market milk has been pasteurized before being offered for sale. During this time the incidence of tuberculous adenitis has been reduced enormously. It would seem, therefore, that milk-borne infection is destined to become a rural rather than an urban problem.

Tuberculosis of the cervical nodes, as an initial lesion, often remains the only clinical manifestion of tuberculosis in childhood, and there are grounds for the belief that frequently it runs its course purely as a local disease which confers an immunity to reinfection for a greater or less period of time.

On the other hand, when the infection proceeds from node to node in the chain, it must eventually reach the efferent vessels which empty into the thoracic duct or subclavian veins, and thus have direct access to the lungs after passing through the right heart and pulmonary arteries.

That such an occurrence is rare may be inferred from the fact that in tuberculous disease of the lungs and bronchial nodes the bovine bacillus is found so seldom, although it is the etiologic factor in at least 50 per cent of the cases of tuberculosis of the cervical nodes.

The bacilli that gain access to the intestinal tract have a much wider field for their activity. One of the earliest lesions resulting from intestinal infection is that of the mesenteric nodes. More or less involvement of the solitary follicles and Peyer's patches probably precedes the disease in the nodes, although it has been proved conclusively that the tubercle bacilli can traverse the layers of the gut without giving rise to any recognizable disease of the gut itself.

The instances of tuberculous peritonitis which show a wide-spread dissemination of miliary tubercles throughout the peritoneum, all in the same stage of development, can best be explained on the grounds of a hematogenous distribution. Not rarely we find peritoneal tubercles in the course of acute miliary tuberculosis, but the type of disease under discussion runs its course chiefly as an abdominal affection, usually as the ascitic form of tuberculous peritonitis.

Cobbett's tables give 16 per cent of cases of miliary tuberculosis in children under five years as due to bovine bacilli, while in meningitis at the same age 18 per cent showed bovine bacilli in pure strains. This assigns the majority of these infections to the human strains of bacilli, and corresponds to the known facts that a majority of cases of generalized tuberculosis are secondary to disease of the lungs and bronchial nodes. The clinical importance of miliary and meningeal tuberculosis in childhood is evidenced by Dunn's figures. Including only those in which the diagnosis was confirmed beyond any reasonable doubt we find, among 291 cases:

124 of meningitis.
54 of miliary tuberculosis without meningitis.
91 of pulmonary tuberculosis.
4 of intestinal tuberculosis.
15 of peritoneal tuberculosis.
1 of (each) bone and joint, cervical adenitis, pleural tuberculosis.

These figures do not give an accurate

index to morbidity from tuberculosis since they include so few of the ambulatory types such as cervical adenitis or the orthopedic cases. They do evidence, however, the tremendous percentage of miliary and meningeal forms, *i. e.*, 61 per cent of 291 cases. If 15 per cent, or even much less, of these types is due to the bovine bacillus one can hardly afford to adopt any other than a definitely protective attitude against milk-borne infection.

The physician who directs the feeding of infants and young children certainly owes to them the duty of informing himself, accurately and at first hand, as to the characteristics of the milk supply. Most up-to-date dairies are on the alert to detect tuberculosis in their cattle, and most large communities have imposed definite regulations to safeguard the public milk supply. The producer who conducts a small milk route, and especially the individual farmer who supplies only his own family's needs, are much less dependable.

Unless they are willing to subject their cattle to veterinary inspection and the tuberculin test, or unless all the milk is pasteurized at a temperature of 150° F. for at least 20 minutes, either a more reliable dealer should be selected or the milk should be boiled for two or three minutes with active stirring before it is consumed by the baby or young child. Particularly dangerous of course is the milk from one cow unless that cow be healthy.

It cannot be too strongly insisted upon that the constant exposure of an infant to a consumptive mother or nurse is almost sure to result in infection, while a large percentage of the infected babies will succumb to clinical tuberculosis. The infants have no chance to escape infection because of their dependence upon the caretaker and because of the frequent close contacts which they develop. Infections repeated at frequent intervals probably break down resistance before it can fully establish itself.

With older and ambulatory children after the second year, opportunities for infection in the home are much less numerous than for the infant, while the chances for casual infection out-of-doors begin to develop. These casual infections, however, are very different from those in which the infecting material is received daily and hourly in concentrated dose.

Infection with the human type of bacillus must occur chiefly through the mouth and nose. The subsequent fate of the organisms until their final lodgment and the production of the primary focus is a matter of much controversy. On pathological grounds we know that the most extensive, advanced and presumably oldest lesions usually are found in the lungs and bronchial nodes.

It seems probable that infection with human tubercle bacilli in childhood readily occurs in the lungs through inhalation; that bovine bacilli, on the contrary, are more apt to be ingested and to cause abdominal forms of tuberculosis.

As to diagnosis, Hamburger divides tuberculosis into three stages, named, as in lues, the primary, secondary, and tertiary. The primary stage consists of the original infection and the resulting primary lesion with the subsequent involvement of the adjacent lymph nodes. The secondary stage comprises the progression of the primary lesions and the development of new active foci. In the tertiary stage we find the chronic lesions, such as those of the bones, and true phthisis as it occurs in adults. As in any classification, the dividing line is not always clear-cut. Well-marked examples of the secondary stage do not offer great diagnostic difficulties. Recognition of the primary stage often is next to impossible, but it is with this that we will especially concern ourselves.

If one analyzes carefully the early history of a case of tuberculosis, one will find a fairly definite picture. A typical case will give the following history:

Subsequent to an attack of measles or whooping-cough, or else originating *de novo*, the child shows diminution in its normal energy, becomes fretful, cries easily over insufficient causes, loses interest in food as well as in activity, and begins to lose weight

or, at least, fails to gain. Sleep is apt to be disturbed, and there may be slight fever, especially in the afternoon. If the chest is involved there may be a cough or a predisposition to "catching cold." If the abdomen is affected, one of the chief symptoms usually is pain after eating, which is almost invariably interpreted at first as indigestion. Both cough and pain may be absent. Ordinary physical examination may be essentially negative. It is clear that such a symptom-complex is not sufficient for accurate diagnosis, but it certainly furnishes grounds for suspicion of tuberculosis.

To be differentiated are chronic tonsillar, teeth and sinus infections; mild types of chronic pyelitis; functional disturbances from overwork at school or an improper regimen at home, with insufficient time for rest and sleep, or dietary indiscretions. The more rare conditions such as endocarditis, leukemia, anemia, lead poisoning, and the psychoses should of course be considered. On the basis of a negative physical examination such patients as a rule are merely given some good advice and a tonic. They return once or twice and usually report a gradual improvement. In a few months they may appear to be well and the incident is closed, although no diagnosis has been made upon any adequate basis. In a definite percentage of such patients this attack merely instances the beginning of a series of tuberculous toxemias which lead ultimately to a fatal termination.

One's duty to such a child therefore is not fully discharged until an exhaustive attempt has been made to rule out tuberculosis. The procedure should be based upon a technique somewhat as follows: History taking as to the chief complaint for which the child is brought to the physician; the date when the first departure from health was noted and the symptoms as they developed. The day's routine should be described, beginning with the rising hour, including the kind and amount of food, frequency of food-taking, and the duration of study, play and sleep.

Careful physical examination from head to foot should be made with the child stripped (in sections if desirable), including the mouth and ears.

After an examination of the urine, blood, and two or three observations of the evening temperature and an adequate study of tonsils, teeth and sinuses, we should be in a position to rule out, with reasonable assurance, all of the conditions noted above except tuberculosis.

We should then begin again in the attempt to prove or disprove a tuberculous basis. The history taking should be repeated for evidence of a possible focus of tuberculous infection to which the child may have been exposed. The mother's history may have been entirely misleading since active tuberculosis has many disguises, even that of perfect health.

Any member of the household or frequent visitor should be held under suspicion if they give a history of chronic cough, failing nutrition, pleurisy, or hemorrhages. Recurring winter cough of old people often is tuberculous. Repeated attacks of pneumonia or of typhoid fever or so-called malaria are always suspicious.

The child should be reëxamined, and more carefully, for evidence of a healed tuberculous lesion such as that of cervical adenitis or of a sinus resulting from tuberculous disease of the bone, and the mother questioned as to the history of a chronic painless ear discharge or of any chronic disease or disability in a joint. None of these factors necessarily gives any evidence of the existence of active tuberculosis, but one or more of them is quite sufficient to increase one's suspicion.

If the original physical examination of the lungs has been done carefully, a repetition may not disclose anything new, as the detection of small lesions is notoriously difficult. It should, however, be repeated, paying particular attention to details. The patient must be placed in a good light sitting comfortably on a stool, and away from the wall of the room, so that no unequal pres-

sure will be made on the chest, and so that notes produced by vibrations in the chest may not be interfered with.

Inequalities of expansion, if they are persistent, suggest the presence of old pleural adhesions. These inequalities occur normally in many children, and only a definite and persistent difference can be taken into account. Percussion must be done very lightly. Impairment over the upper mediastinum is deceptive owing to the irregular development of the upper lobes toward the median line in early life and to the persistence of the thymus. Increased paravertebral dulness in the region of the bifurcation of the trachea (spinous processes of the three or four dorsal vertebræ) is suspicious. D'Espine's sign should be sought for; it is elicited as follows: With the patient in the erect position, the head flexed on the chest and the arms folded, the examiner auscults in the median line of the back, beginning at the sixth cervical spine.

D'Espine's sign consists of a whispering sound which occurs definitely after vibrations of the spoken voice have ceased. This is an unusual phenomenon and is usually interpreted as an early sign of tracheobronchial adenopathy. It must not be confused with the bronchial character of the whispered voice which is heard normally as far down as the seventh cervical to the second dorsal, depending upon the age of the child. When the whispered voice, elicited by having the child whisper "tree," is heard below these levels, it also is interpreted as a sign of adenopathy.

The significance of the whispered sound (D'Espine's sign), and of the whispering voice below normal levels, must be accepted with some reserve. *Per se* they do not constitute valid grounds for the diagnosis of tuberculous adenopathy, but their presence certainly adds to suspicion. At the same time it is not to be forgotten that other organisms than the tubercle bacillus may produce enlargement of these lymph-nodes.

In the examination of the lungs the late expiratory cough should always be employed, when possible, to bring out latent râles. In children apical lesions are rare. Most of the pathologic changes will be found in the lower part of the upper lobes and the upper part of the lower lobes, and in the middle lobe on the right. The favorite sites lie at or near the roots of the lungs.

At the time of the first examination a Von Pirquet tuberculin skin test should be done, and the results observed daily for three days, since a positive reaction occasionally is delayed until after forty-eight hours. Under two years of age this positive result usually means that there is an active lesion, as sufficient time for healing has not elapsed since infection. As age advances the clinical value of the test decreases. Children who show a definite reaction, however, should always be treated as potentially tuberculous until long experience has demonstrated their freedom from active disease.

A negative reaction unfortunately means nothing in an acutely ill child. In the mild type under discussion, however, negative reactions to two Von Pirquet tests, two weeks apart, and a final negative response to the intradermal or Mantoux reaction, furnish extremely valuable evidence against tuberculosis. It is important to assure oneself of the potency of the tuberculin from time to time.

While waiting for the results of the Von Pirquet test, a record should be kept of the temperature taken by mouth or rectum and pulse at 8 and 12 A.M., 4 and 8 P.M., and a careful weighing made at three-day intervals. At least five minutes must be allowed for the temperature to register. A morning rise to 99° or an evening register above 99 2/5° with the child at rest is suspicious. A pulse-rate easily accelerated and slow to return to normal also is suggestive. Stationary weight in a child is the equivalent of loss of weight in an adult.

To sum up we may consider that a child who is suffering from an ill-defined state of ill-health with febrile reaction, which cannot clearly be ascribed to other conditions such as infected tonsils, should be

held under strong suspicion of having clinical tuberculosis, if the tuberculin reaction is positive. This suspicion becomes almost a certainty if there is definite history of exposures to open tuberculosis, with the presence of a positive D'Espine's sign, pulmonary "congestion" in the upper or middle lobes, loss of weight and continuance of fever, even though it be irregular and very slight. In most instances of a positive Von Pirquet reaction we will be unable to determine any definite physical signs of tuberculosis. In these we will have to rely on the symptoms of toxemia. In the absence both of physical signs and toxic symptoms we can only hold the child under suspicion long enough to prove or disprove the existence of clinical disease.

A word of caution is in order with regard to the attempt, which has been outlined, to rule out the presence of tuberculosis. Very few parents are sufficiently stoical to be told of its exact purpose. The mental anguish of some mothers as they watch for the development of a Von Pirquet reaction justifies a camouflage of our intentions. No matter how intelligent the mother, she rarely can be made to feel that infection does not mean a serious or fatal illness. To speak of a search for some hidden focus of infection, with no possible intimation of tuberculosis, is much more humane.

Having satisfied oneself that tuberculous infection has occurred, it may still be unwise and unnecessary to publish the fact. We are dealing with a disease which automatically shows a high proportion of recoveries. Until we are reasonably sure that radical and prolonged treatment is needed or unless we fail to secure proper coöperation, the parents can be spared unnecessary anxiety.

The patients will fall roughly into three classes:

1. Those three years of age or younger.
2. Those over three years who are below normal weight for their height.
3. Those over three years with normal or superaverage nutrition.

Children in class 1 should be watched very carefully and be given the benefit of any doubt, since tuberculosis at this age is one of the most serious and fatal diseases.

Children in class 2 demand more supervision than those in class 3 because of the greater probability that the disease will progress.

Children in class 3 will show the highest proportion of recoveries.

In any class, if there is a definite history of exposure to tuberculous infection in the home from one or both parents or caretaker, there is greater probability that a massive infection has occurred and that the primary lesion is extensive.

In the absence of any specific measure of resistance to tuberculosis, such as the Schick test, the state of the nutrition can be accepted as the best index. This is certainly true of the individual who has never been under treatment.

In the attempt to improve the nutrition, various causes of the failure of the child to thrive must be carefully sought for, evaluated, and if possible obviated. The history of many of the patients with primary lesions will show that under-nutrition has existed years before infection occurred.

From the results obtained in nutrition clinics it would seem that simple malnutrition is due in large measure to insufficiency, improper selection or improper preparation of the food. After these comes a variety of causes, among which overactivity and insufficient rest and sleep, diseased tonsils and teeth, and an indoor life play important rôles.

Some of the children owe their defective physiques to hereditary influence, and no amount of effort will overcome it. The remote causes for this cannot be ascertained, but the explanation may depend often upon ancestral tuberculosis. Certainly tuberculosis is the most common disease which causes defective nutrition in early life and the disease which, in the past, was most likely to affect the children.

In other children the malnutrition depends definitely upon an active tuberculosis.

When we come to the question of treat-

ment of the active stage for any of the patients, whatever the class, we must first determine the degree of toxemia and the effect upon nutrition. Many very mild cases in class 3 can be treated as ambulatory patients provided they are under observation. For patients in class 1 and class 2 treatment should be begun in bed and continued until we have determined the probable course, have secured a satisfactory gain in weight, and until the symptoms of toxemia, such as fever, malaise, and anorexia, have abated. The latter always constitute an indication for a strict regimen.

Treatment of active tuberculosis in children depends upon the same basic principles of rest, good food and fresh air as does its treatment in adults. The chief variations in the application of these principles depend upon the difference in the psychic characteristics at the two age-periods. Absolute rest is so irksome to children, unless they are prostrated from a severe toxemia, that it is next to impossible to secure it. We must be satisfied with relative rest. In this the child is kept in bed or, in cases almost afebrile, on a reclining chair. Any kind of quiet amusement can be permitted, which does not require any except slight muscular exertion. The periods of play should be interrupted by periods of rest in the supine position. At such times the child may be read to if sleep is impossible. In every case a full twelve- or thirteen-hour rest should be secured at night.

Another psychic difference is the freedom of most children from worry and mental depression, and their contentment with a protracted course of treatment. In the administration of food there is chiefly this difference, that the child cannot as a rule stand forced feeding. A persistent anorexia in a child usually means that food will not be well borne even if it is forced. Exceptions may be noted in those neurotic children who often are true examples of hysteria.

"Fresh air" treatment can be given more thoroughly with children than with adults, and with even better results. The child can be moved indoors so easily from a porch for his meals and bathing, etc., that the practical application of fresh air therapy is greatly facilitated.

The chief exceptions, in cold weather, are the children with diseased tonsils and adenoids. The cold seems to have an irritating effect upon the unhealthy mucosa. Sedative treatment and possibly the removal of adenoids under gas-oxygen anesthesia would be indicated.

Drug treatment of primary tuberculosis is soon described. It consists of an occasional mild unirritating laxative such as magnesia or mineral oil, dilute hydrochloric acid and nux vomica for persistent anorexia which fresh air will not cure, and cod-liver oil when anorexia is not in evidence and the digestion permits. With the oil may be combined the iodide of iron, or, if anemia be well marked, citrate of iron and cacodylate of soda may be given hypodermically. More drugs than these probably will be harmful because of disturbing digestion or appetite. Food is more important than any drug. Less than these frequently are sufficient.

Krauss' conception of the action of the tuberculin seems to be the most plausible. He believes that it acts only by increasing the blood supply and subsequent cicatrization of the tuberculous focus. He can find no evidence that it increases resistance to tuberculous infection or to the action of the tubercle bacillus in those already infected. Since this congestion of the tuberculous focus may not always be followed by cicatrization but may simply favor the extension of the active process, extreme care must be used in the selection of cases, gradation of the dose, and the performance of the technique. No one should attempt its use without a careful preliminary study of the subject. Precautions above all others in importance are that the initial dose should be infinitesimally small, 1/100,000 of a milligramme, and that a reaction should be carefully avoided.

The treatment of these patients does not end with the subsidence of all toxic symptoms. Patients in class 1 and class 2 should be reëxamined several times during the first year, and yearly thereafter until after puberty.

Children in class 1 and 2 should be required to keep track of their weight, to report any loss or failure to gain, or the occurrence of any acute infection such as measles or influenza. As long as their nutrition is 10 per cent or more below the normal average for height, the diet should be carefully supervised and rest periods observed. In selected cases *x*-ray examination of the chest should be done twice a year or oftener, so that structural changes can be recognized promptly.

Many of these patients will be unable to keep above the ten-per-cent weight limit. If, in addition to this, the child shows poor resistance to infections of the respiratory tract and suffers from indigestion, it will be safer to make a radical attempt so to plan its life as to offer the best chance for resistance to the tubercle bacillus.

The type of play which is not too strenuous, the love of outdoor life and fresh air within doors, the value of diet and sleep, the danger of physical exhaustion, especially if repeated, the healthfulness or harmfulness of certain types of occupation —all of these lessons should be thoroughly learned without panic but without any belittling of their importance. Childhood is the receptive period when lifelong habits can be made or the chances for a long life ruined.

Patients in class 3 also should be supervised, but their ultimate chances of recovery are much better. If they do well after a reasonable period of observation, it is hardly fair to class them as tuberculous at all, since they will form the great army of individuals who live an active life, die a non-tuberculous death, and merely carry with them traces of the conflict in the form of trifling puckered scars or calcareous nodes.

1828 Pine Street.

Local Treatment of Eczema.

In the *Virginia Medical Monthly* for October, 1922, Anderson states that a careful history should be taken as to the patient's general health, etc., and special attention should be given to finding if the patient is coming in contact with any irritant that might be causing his condition. The patient's occupation, habits and clothing should come under suspicion. On the hands, soap, dish-washing, oil or any chemical or mechanical factor should be inquired about; likewise, on the face and neck, the use of hair tonics, dyes, fur neck pieces, etc., should be asked about. Anything that one might consider as having a bearing on the case should be eliminated from contact with the part and treatment instituted. He has on two occasions seen an obstinate eczema of the mouth disappear after a change of tooth paste.

For the purpose of treatment, eczema may be divided into the following clinical types:

Primary: Erythematous, papular, vesicular, and mixed.

Secondary: Pustular, squamous, and lichenified or infiltrated.

Local treatment, to be successful, should be based upon the predominating type of lesion, each type requiring a distinct plan of treatment, and in no branch of therapeutics is attention to detail of more importance than in this.

Anderson does not attempt to give all the various methods of treatment, but to try and outline those which he has found to be of value in his own work.

The erythematous type usually appears upon the face or hands, the parts exposed to the weather, and in the acute form may give rise to so much redness and edema that it may at first glance be mistaken for erysipelas, but the absence of the systemic symptoms accompanying the latter will usually clear the diagnosis. These cases as a rule are very susceptible to the action of the sun and wind, so they should be kept indoors during the treatment. During this stage of the disease, cold compresses of boric acid, liquor Burow (liquor alumini

acetatis—Ed.) or a one-per-cent solution of resorcin alternated with calamine lotion, will relieve it. When the case has been passed into the squamous or infiltrated stage, the treatment should be changed to correspond. The papular type is somewhat more difficult to handle, and a good routine in these cases is to use a lotion of fifty-per-cent alcohol with the addition of three-five per cent each of salicylic acid and liquor carbonis detergens. This should be applied two or three times daily, followed by a starch and zinc oxide paste. If this fails to give relief, a five-per-cent solution of nitrate of silver painted on once daily, with calamine and zinc oxide lotion in the interval, will usually suffice.

The vesicular type is best treated with crude coal tar, using the formula of Dr. C. J. White, which consists of crude coal tar and zinc oxide, of each six parts; "vaseline" and starch, of each forty-four parts. The first two should be mixed and then added to the latter, producing a black ointment smelling strongly of gas. This should be applied to the lesion once daily and romoved with olive oil before the next application. This produces a soothing, desiccating action that is very rapid and satisfactory in its result. If the tar is not available or the patient objects to its use, cold compresses of boric acid or lotio nigra, followed by the application of the starch and zinc paste, is satisfactory.

The pustular type is secondary to one of the primary types, usually the vesicular, which is infected by scratching, but on the body it may be secondary to scabies which has become irritated by treatment and scratching. The infection should be cleared up by the use of boric acid compresses and the use of a two-five per cent ointment of ammoniated mercury with an equal amount of ichthyol. After the infection has disappeared the treatment should be changed to correspond to the type of lesion remaining.

After the subsidence of the acute stage of the vesicular and erythematous types, one will find the skin dry and scaly, with a slight thickening; this forms the so-called squamous type. At this point Lassar's paste, with the addition of three-five per cent ichthyol, will prove satisfactory. Three to five per cent resorcin in starch and zinc paste is also useful. If the condition is very chronic, a lotion of twenty grains of salicylic acid and forty gains of tannic acid to the ounce of fifty-per-cent alcohol will sometimes give excellent results, but must be used with caution as it tends to irritate.

The lichenified or infiltrated type of the disease as a rule follows repeated attacks of the vesicular or erythematous, each attack aided by the scratching producing more thickening, until the skin cannot be picked up between the fingers. In the milder type the skin has a leathery feel with an exaggeration of the normal lines of the skin. The best treatment of this condition is by the use of *x*-ray or radium, with phototherapy a second choice. If these are not available, one of the vegetable tars may be used, preferably oleum rusci, beginning with six per cent of the drug in a starch and zinc paste and increasing, as the lesion shows tolerance, until the undiluted tar is painted upon the area. Chrysarobin is sometimes of value by causing an irritation which changes the chronic, sluggish condition to an acute one, which is then soothed with a bland ointment, and the process repeated until the infiltration has disappeared. No matter what the treatment, the condition is very prone to relapse.

There are two drugs commonly used in the treatment of eczema which are responsible for the prolongation of many cases which would otherwise be cured in a short time. These are sulphur and bichloride of mercury. The former is capable of producing a very intense dermatitis which we have all seen following the treatment of scabies, and is only useful where the condition follows the scratching and irritation in a case of scabies. Bichloride is capable of doing no good in these cases, and is capable of transforming a small patch of eczema into an acutely spreading case which will cause the patient a great amount of unnecessary suffering.

Editorial

THE EFFECT OF MERCURY ON THE KIDNEYS.

Nearly a century ago Dr. John Kearsley Mitchell, Professor of the Practice of Medicine in the Jefferson Medical College, emphasized the value of calomel as a diuretic in certain conditions of renal disease. Later the celebrated pill of Niemeyer containing calomel, squill, and digitalis obtained a great vogue, and thirty years ago, or thereabouts, Jendrassik wrote a paper upon the diuretic influence of calomel, which was received by the profession as if it were a new contribution to this subject. At that time Weir Mitchell called our attention to the fact that his father had antedated Jendrassik by some fifty or sixty years.

With our improved knowledge of the function of the kidneys and of the liver, it would seem probable that in those instances in which calomel seems to exercise a diuretic effect this influence is indirect, in that its influence upon the liver in connection with the formation of urea and other substances is probably the chief factor in the increased urinary flow.

Within the last five or six years more than one paper has been published by laboratory workers which have seemed to indicate that the presence of chronic nephritis, or, particularly, acute nephritis, contraindicates the employment of mercury. Their investigations showed that mercury has a particular affinity for diseased or inflamed kidneys, and they have issued a warning designed to prevent physicians from administering this drug freely in the presence of such a condition.

Without doubt there is some truth in their position, since it is entirely possible that the constant administration of full doses of mercury to those who are suffering not only from nephritis, but from syphilis, may be disadvantageous from the renal standpoint. On the other hand it would be unfortunate for the profession to gain the idea that calomel is generally contraindicated in nephritis, the more so as some of the researches to which we have referred have been carried out with quantities of mercury which are far in excess of those commonly employed in medicine. Thus, in a paper which has recently been published upon the pathological lesions produced in the kidney by small doses of mercuric chloride, reference is made to the studies of Kolmer and Lucke, who investigated the effect of repeated doses of the various heavy metals that are often employed in medicine. They administered as much as 0.0002 per kilogramme of weight every five days for six doses, and found that this caused scattered areas of fibrosis in animal kidneys. So, too, single doses of the same amount, or even smaller amounts, did not seem to be devoid of pathological effect upon the renal tissues. While it is true that they found that only certain highly specialized segments of the renal tubules were affected, producing patches of degeneration in the kidney cortex, nevertheless, if these parts are already diseased, we can readily understand that this additional damage might be disastrous.

On the other hand, when we come to study the effects of drugs used in the laboratory upon the lower animals, it is only proper to compare the doses administered with those which are commonly employed in therapeutics, and it will often be found that the doses that we have referred to may be considered as practically toxic to the human being; that is to say, that they were as high as 1/300th of a grain of mercuric chloride per kilogramme, which would be many times the dose which would be given to a human being; indeed, a dose which would probably be competent to produce death in many instances. This is a point to which too little attention has been paid in the laboratory and also in connection with medicolegal testimony. For example, we have known of instances in which a dose of arsenic has been given to a rabbit, the size of the dose being non-toxic to

man, but as the rabbit weighed but a few pounds and the human being weighs many pounds, it was, of course, the subject of violent poisoning. A so-called expert then testified that the dose was a toxic one. Those who work in the laboratory and state the doses per kilo are manifestly correct in that consideration of the weight of the recipient is adhered to, but great care should be taken that therapeutic conclusions are not reached based on doses which in animals and man would be definitely toxic.

THE DISTRIBUTION AND EXCRETION OF ARSENIC AFTER THE INTRAVENOUS USE OF ARSPHENAMINE.

The title of this editorial must at once bring to the mind of the reader the importance of a subject which has recently been investigated by Clausen and Jeans and reported in the *American Journal of Syphilis.*

We know far too little about the affinity of drugs for different tissues of the body and about the rapidity with which they are eliminated, which is equivalent to saying that we know little about the time that their influence is continued.

The research to which we refer was limited to children. Nevertheless it has direct bearing upon the influence of arsphenamine in adults as well. These investigators tell us that arsphenamine when given intravenously rapidly passes from the blood, so that only 10 per cent remains at the end of an hour, that it is contained only in the plasma and not in the cells, and that the organs which take up the largest amounts of the drug are the liver, the small and the large intestine.

As to elimination it seems to begin with great rapidity, but is continued over a long period of time, so that it does not stop until more than two weeks have elapsed, since traces of arsenic are found so far as the urine is concerned for over a fortnight. Even two or three weeks after its administration they found that fifty per cent is still stored in the tissues. Another interesting point is that it is eliminated in the stools as well as in the urine; indeed, five times as rapidly by the former as by the latter.

These results are practically confirmed by Weiss and Raiziss, who recently reported in the *Archives of Internal Medicine* that only a small part of the arsenic escapes through the kidneys, but 13.5 per cent passing in the first fourteen days after the use of arsphenamine, and the larger part of this in the first three days. They also found that larger amounts escape from the kidneys with subsequent doses. Weiss and Raiziss also agree that a considerable amount escapes in the feces, and that the liver seems to be its chief point of storage, although some retention takes place in the spleen, kidneys, intestines, and elsewhere.

A point of very great importance which Clausen and Jeans deal with is the amount of arsenic found in the cerebrospinal fluid. This reaches its highest point at the first or second hour after injection, but equally important they found that the amount of arsenic present there depended upon the amount of inflammation also present, and in some children in whom no evidence of syphilis of the nervous system was present no arsenic was found in this fluid, the quantity being in direct proportion to the severity of the inflammation. Confirmatory of the fact that pathological changes are essential for the presence of arsenic in this fluid, they found that the amount of the drug diminished constantly with succeeding injections; in other words, as the drug produced its therapeutic effect the pathologic conditions were modified and the passage of the arsenic into the fluid diminished.

From many points of view the last conclusion which they reach is of the greatest interest, namely, that the arsenic content of the spinal fluid is at least as great in cases of cerebrospinal syphilis after the intravenous administration of arsphenamine as results from the intraspinal injection of arsphenamized serum according to the Swift-Ellis method.

Our readers will recall that some months ago we published a most interesting contri-

bution from Professor Dercum along this line, in which he held to the view that spinal puncture for the introduction of arsphenamized serum was advantageous either by relieving pressure or possibly by aiding in the entrance of arsenic into the subarachnoid space from the blood. With this view we believe that Sachs is in accord, although it has been bitterly opposed by Fordyce and others. We confess that our clinical experience has been along the line advocated by Dr. Dercum, which is the intravenous injection of the drug followed by fairly free drainage of the cerebrospinal fluid.

It is interesting in this connection to refer to another communication in the same issue of the *American Journal of Syphilis* by Alford. Writing on "The Pathogenesis and Treatment of Tabes Dorsalis and General Paralysis," he points out that the primary object of spinal injection of arsphenamized serum was the introduction of antibodies to counteract toxins and destroy parasites and not the introduction of chemicals as many seem to suppose. Of course, if this view is taken, the arguments advanced by Dercum and others are of diminished effect.

Finally, there is one other point to be considered in connection with this whole matter of the administration of arsphenamine in syphilis, namely, its medicolegal importance. A number of years ago Jesionek and others pointed to the fact that elimination of the total quantity of the drug was slow. In a given medicolegal case in which traces of arsenic are found in the body by a chemist it would be practically impossible to convict the accused if it could be shown that he had been treated by the use of arsphenamine at any previous time: (1) because it remains in the body, according to the investigations we have just quoted, for several weeks, and (2) because the defendant is always given the benefit of a doubt, and unless it could be shown that all the arsenic is gotten rid of within a few weeks, it could be claimed, in law at least, that the arsenic found on chemical analysis in the body of the deceased was not due to its administration with criminal intent but only to previous treatment by a physician who had used some arsenical compound.

These facts are the more impressive because it will be recalled that it is not necessary that the chemist should find large quantities of arsenic in a body which is examined medicolegally. It is well recognized in toxicology and medical jurisprudence that only an infinitesimal trace need be discovered, since it has been found by experience that in many cases of arsenical poisoning, which are subacute or chronic or even acute, the arsenic may pass out of the body after having induced its deleterious effects, leaving behind it only a trace. Probably arsphenamine would be more persistent in producing traces of arsenic in the body than would the less complex compounds which are commonly used in therapeutics, such as arsenic trioxide or the arsenite of potash.

THE TREATMENT OF CHOREA BY INTRASPINAL INJECTIONS OF MAGNESIUM SULPHATE.

It will be recalled that nearly two decades ago Meltzer and Auer reported upon the remarkable effect that a solution of magnesium sulphate has upon nerve tissue when brought in contact with it, and also showed that this influence was comparatively fleeting in that it could be removed by washing the part with normal saline solution. The chief clinical use to which they applied this influence of magnesium sulphate was in the treatment of tetanus, in which disease it was found to definitely modify the severity of the symptoms, although not directly influencing the infection and the ultimate result of the case except in so far that the patient's vitality was preserved by the prevention of suffering. The solution used was 1 cc of 25 per cent to each 25 pounds of body weight. Its use in tetanus has come to be virtually standard as an ameliorating measure both in this country and abroad.

In a recent issue of *La Presse Médicale*, Paulian and Dragesco of Bucharest quote Calcaterra as having used magnesium sul-

phate subcutaneously in epilepsy, and state that he has also employed chloride of magnesium intravenously in chorea. Paulian and Dragesco point out that Marinesco and Gradinesco have treated sciatic neuralgia by intraspinal injections of magnesium sulphate and have also used it for the relief of the gastric crisis in tabes and in the treatment of chorea. In the last affection Marinesco considered that he had obtained remarkable results. It is true that for a few hours there was some disorder of the sphincters, but this passed away by the next day, and he believes that most of the disagreeable symptoms which are induced are dependent not upon the strength of the solution, but chiefly upon the impurity of the salt employed.

The authors that we have quoted as having contributed this latest communication upon the subject state that they have used neoarsphenamine intravenously in acute chorea with some success, but they consider that the results which they have obtained from magnesium sulphate after the injection of 1 or 2 cc of the 25-per-cent solution have been admirable. They first draw off a quantity of cerebrospinal fluid equivalent to the amount which they are going to inject, but they also insist upon the necessity of the clinician being absolutely sure of the purity of the salt.

They report in detail four cases, one of them treated after failure following the use of neoarsphenamine intravenously. In one case in which the choreic manifestations were very severe and complications consisted in endocarditis and albuminuria, they felt that the use of arsenic was contraindicated and used magnesium sulphate with success, the first effect being a diminution of the severe movements and later a diminution in the minor ones.

Incidentally they tell us that they too have used magnesium sulphate intraspinally in severe cases of gastric crisis in ataxia, in some of which cases they seem to have found that the intravenous injection of adrenalin is of value if hypotension is present.

The particular case which they report is that of a man of thirty-four who acquired syphilis approximately ten years before, and who suffered his first gastric crisis in April, 1919. Two months later the attacks were so severe that they lasted two or three days and were accompanied by hematemesis. The *x*-ray examination showed a spasm of the pylorus. On the subsidence of the attack there was still nausea, epigastric pain, and constant eructations. They therefore resorted to the intraspinal injection of 1 or 2 cc of 25-per-cent magnesium sulphate solution. This was followed by loss of power in the lower extremities, retention of urine, and severe pain in the limbs and head, but the following day these manifestations disappeared and the patient was much better, so that they believe that the treatment is worthy of trial.

The question arises as to how much the advantage which was obtained in all of these cases was due to the spinal puncture and how much it was due to the magnesium sulphate. If we were tempted to employ this method of treatment we think we would try the effect of spinal puncture alone, and then, if it failed, resort to gradually increasing quantities of the magnesium sulphate solution as suggested in the article which we have quoted. Manifestly, this treatment would hardly be resorted to unless the choreic manifestations were so severe as to have resisted all ordinary methods of treatment.

THE INDICATIONS FOR TONSILLECTOMY IN INFANCY AND CHILDHOOD, AND THE DANGERS.

Our readers will remember that we have frequently dealt with this subject in our Editorial and Progress columns, the last reference to the matter being made in the September issue, when we discussed the results which are being obtained by the use of the *x*-rays in treating diseased tonsils, whereby the older operations for their relief are avoided.

We have also called attention to the contributions of Moore upon the frequency of

pulmonary and other thoracic complications after operations upon the tonsil, and many years ago we quoted an able article by Mackenzie of Baltimore, to which we have since referred on a number of occasions, in which article, under the title of "The Massacre of the Tonsil," this man of wide experience protested against the onslaught which was being made upon these organs.

That the extirpation of the tonsils is sometimes indicated and is followed by excellent results cannot be denied, but just at present it would seem that teeth and tonsils are being removed with a degree of enthusiasm which has led to excess, and, therefore, we have thought it of interest to call attention to an article by Heiman contributed recently to the *American Journal of Diseases of Children*. He points out that during the last few years "there has been engendered in the minds of medical men what he calls an unbounded spirit of antagonism toward the faucial tonsil. The pendulum has been swinging toward extreme radicalism. The tonsils have been held responsible for almost every disease of childhood; as portals of entry and foci of infection they have been accused of causing every form of pathological condition. The obsession has spread to the laity, who are now, with or without medical advice, demanding the complete removal of the tonsils as a routine hygienic measure."

Heiman tells us that last year the medical school inspectors of New York City recommended tonsil treatment for 49,230 children, and that if this rate was extended to the whole country it would mean more than a million children. He then well points out that tonsillectomy is a major operation, that its risks are definite, with a large number of serious complications which have and have not been reported, and he asserts that the indiscriminate removal of the tonsils should be condemned.

It is interesting to note that at the beginning of his contribution he points out that the tonsils are by no means useless appendages in that they carry on phagocytosis when invaded by germs; their tissues contain an enormous number of phagocytes. There is also evidence that bacteriolysis takes place in the tonsillar tissues, and he even goes so far as to state that it was common knowledge before antitoxin was introduced that tonsillar diphtheria ran a milder course than where it involved adjacent parts.

Heiman further quotes J. B. Wood as having proved the production of lymphocytes in the tonsils, and Piersol as showing that a large number of lymphocytes pass through the tonsils into the oral cavity to become the salivary corpuscles. Further, that these glands take an important part in the lubrication of the food and throat during eating, speaking, and singing. An examination of the cases which have been operated on reveals that there are a large number of instances in which cicatricial tissue, adhesions, and destruction of muscle tissue has occurred, so that Kenyon and Kradwell think it conservative to say that "following tonsillectomy the palatoglossus and palatopharyngeus muscles are never wholly normal in their action."

To those who are enthusiastic about tonsillectomy, Heiman's attitude will be a shock. He virtually denies that the removal of tonsils materially diminishes the frequency with which patients catch cold. Out of forty cases only fourteen showed an improvement either as to coryza or as to other infections of the upper respiratory tract.

Dealing with the relationship of tonsillitis to rheumatism, Heiman expresses the view that there is no definite relationship as to cause and effect, believing that cardiac manifestations would be much more frequent if the tonsils are really a factor. He then goes on to quote a good deal of the literature of the subject, considering the evil symptoms which tonsillectomy may induce, quoting Koplik as noting a moderate febrile reaction, endocarditis, severe sepsis, hemorrhage and bronchopneumonia as frequent sequences, and Sewell as reporting 50 cases of serious hemorrhage with 19 deaths following removal of the tonsils.

He further tells us that during the past three years there have been admitted to the Mt. Sinai Hospital in the Children's Department, seven cases of lung abscess,

seven cases of bronchopneumonia, and one of lobar pneumonia, all of which developed after tonsillectomy.

Altogether it is evident that Heiman has been able to present a rather strong case against considering tonsillectomy as a minor matter, and we think that his paper should receive much attention.

It is interesting in this connection to become familiar with the rules which govern him as regards advising this form of surgical interference. He names them as follows:

1. "If there are obstructive symptoms, mouth breathing (snoring at night), with no evidence of a high arched palate as the cause of obstruction, the adenoids should be removed."

2. "If there is a persistent nasal discharge that does not yield to the usual therapeutic measure and in the absence of a sinusitis, the adenoidectomy should be performed."

3. "If the tonsils are sufficiently large to cause obstruction, difficulty in breathing or swallowing, tonsillectomy is indicated. One must not be misled, however, by the presence of a large tonsil that appears to be obstructive, a tonsil that is rather pushed out toward the median line by the presence of a deep cervical adenitis. He has described these cases as parapharyngeal adenitis. It occurs most commonly after grippe, scarlet fever, and measles."

4. "If the frequent occurrence of tonsillitis has produced definite disease in the tonsils, as evidenced by irregularity, raggedness, and friability, tonsillectomy is indicated."

5. "If there is recurrent accumulation of cheesy material in the crypts of the tonsils, or if on pressure this may be extruded from the tonsils, with the presence of a foul odor of the patient's breath and symptoms of toxic absorption, the tonsils should be removed."

6. "In cases of persistent cervical adenitis following tonsillitis, whether by pyogenic or tuberculous origin, tonsillectomy is indicated."

Perhaps many clinicians will say that they are accustomed to follow just such rules and agree with Heiman that to be too enthusiastic in the resort to tonsillectomy is of course an error.

If it be true that tonsillectomy is followed in a fairly large proportion of cases by bronchitis or more serious pulmonary complications, it is manifest that it is proper to consider what may be done to avoid such catastrophies. In this connection there can be little doubt that too little attention is paid to septic conditions in the mouth. Indeed, such carelessness is generally met with whenever anesthetics are employed, little attention being given to the condition of the teeth or to abscesses in their sockets, so that not infrequently during the administration of the anesthetic, particularly if mouth forceps are employed, considerable quantities of pus are set free in the secretions and are readily inspired. We have long taught that before the administration of an anesthetic, careful attention should be paid to the condition of the mouth, and when the use of an anesthetic is immediately demanded a certain amount of asepsis can be instituted by rinsing the mouth with a 1:3 solution of peroxide of hydrogen followed by plain water, and this in turn by rinsing with water containing half a teaspoonful to a teaspoonful of tincture of iodine to the glass.

Attention has been called to this matter once more in a recent article by Chipman, who, in addition to advising that only light anesthesia should be used, strongly advocates that the head should always be down in operations upon the tonsils and that a suction apparatus should be continually in place to keep the pharynx as clear as possible of accumulated secretion and blood. He goes one step further and advocates that the tonsils and pharynx should be painted before operation with tincture of iodine of 50-per-cent strength, and that the site of the operation should be swabbed with this after the tonsils are removed. Again, that the patient should be returned to his room with the head low, and he even advocates that the foot of the bed should be elevated in order to prevent drainage by gravity into the deeper thoracic organs.

It will be noted that posture advocated by Chipman is directly opposed to that ad-

vocated by many surgeons in New England, who are in the habit of operating with the patient in the semierect posture, in which district it has been shown that a considerable number of postoperative complications have been met with.

Another point is the avoidance of tearing and crushing the tonsils in the attempt to remove them, since by this means free pus is squeezed out into the pharynx and readily finds its way to an area where it can do damage. The frequency with which the streptococcus hemolyticus and other virulent germs are found in the crypts of the tonsils emphasizes the importance of this last point, the more so as it will be recalled that Nichols and Bryan recovered the streptococcus hemolyticus from the crypts of extirpated tonsils in 75 per cent of 100 patients, and that others have found this organism present in an even higher percentage.

Our readers will be glad to know that in the March issue of the GAZETTE this subject will be carefully considered by a number of laryngologists of wide experience.

PAIN IN GENITO-URINARY LESIONS.

Perhaps the commonest symptom which brings a patient to his doctor is pain. In its location, intensity and radiations it is perhaps the most valuable single symptom in indicating the seat, if not the cause of the pathology. At one time the importance of this symptom was largely accentuated in current literature. This at the period when the little help afforded by laboratory examinations was almost negligible and when physical examination had not become so largely developed as is the case at the present time.

At the present time a contribution dealing with pain as indicative of the seat of lesion is somewhat unusual, and Irwin's article in the *British Medical Journal* of September 9, 1922, indicating generally the type, and the radiations of pain in genito-urinary affections, is not without its value. In so far as renal lesions are concerned, these may reach an advanced state of development without any pain, providing there be no acute obstruction to the flow of urine. This is a well-recognized fact, the pain of obstruction being attributable to rapidly developing pelvic and capsular tension. A partial ureteral obstruction may cause an enormous hydronephrosis which attracts attention solely by its bulk, the patient having experienced no pain. Capsular tension may be caused by circulatory changes such as are induced by infarcts, acute inflammatory lesions, obstruction to the venous return, as from unduly mobile kidney. The pain from such tension may be as acute as that from sudden stone blockage, but with radiations not so characteristic.

Renal colic implies a sudden ureteral blockage, overfilling of the renal pelvis, rapid increase of capsular tension, and is characterized by a shocking pain which radiates along the genital and urinary tract; at times this pain, in the intervals between acute attacks, or in the absence of these, is referred to the thigh, the leg, or even the heel.

Where the obstruction, or capsular distention, is of moderate degree, there is often a dull and persistent ache, referred usually to the costovertebral angle, sometimes to the front of the abdomen. In a sufficient number of these cases to render this circumstance worthy of careful consideration, the pain and distress are distinctly intra-abdominal and have led to unnecessary operations, as proven by the fact that on later discovery of the obstructing or irritating cause in the kidney, to wit, stone, and on the removal of this cause, the pain and digestive symptoms for the relief of which other operations had proven futile promptly disappear.

It should also be borne in mind that the referred pain from kidney tension, whatever be its cause, may at times be experienced in the region of the unaffected kidney, and before the use of instruments of precision operations were performed upon a healthy kidney, the surgeons being misguided by the single symptom of pain.

Tuberculosis of the kidney may be pain-

less, be accompanied by a backache referred to the costovertebral region, may exhibit radiations to the abdomen, the bladder, and along the course of the urethra. At times this pain may be along the genito-urinary tract or down the thigh and leg, or, if there develop obstruction to the ureters by blood clot, may exhibit the typical picture of renal colic. Oxaluria is often attended by the backache typical of slight capsular tension. A floating kidney by kinking the blood-vessels or obstructing the ureters may develop an acute capsular tension attended by the agonizing and typical pain of renal colic.

Frequency of urination, aside from that incident to polyuria, may be purely a renal reflex; when this symptom develops and is attended by urgency and pain it is practically always indicative of an inflammatory condition at the neck of the bladder. If there be pain connected with lesions of the upper portion of the bladder this will probably be referred to the suprapubic region. Pain of vesical origin is usually due to lesions about the ureteral orifices or in the trigone, including under this term the region of the vesical sphincters. Pain typical of inflammatory lesions in this region is aggravated by the urinary act, worse at its end, and referred along the urethra to a point in the lower portion of the lumen of this tube just behind the meatus.

Pain of purely prostatic origin is more likely to have the radiation toward the rectum with a sacroiliac ache, whilst inflammation of the seminal vesicles, in addition to the deep perineal pain, exhibits radiations toward the hip-joint of the corresponding side.

Perhaps the most persistent, severe and uncontrollable pain incident to inflammation of the bladder is that which occurs symptomatic of tuberculous involvement. In so far as pain is concerned, this, with the patient suffering from enlarged prostate, does not begin as a rule until his obstruction is complicated by infection, too often implanted by injudicious instrumentation. In the absence of acute obstruction or inflammation the bladder may be so distended as to reach the umbilicus without the patient experiencing any pain of such moment as to attract or distract his attention.

Valuable and indicative as is the symptom, pain, in genito-urinary conditions it is of main value in calling for that form of complete examination which each year is lessening the number of needless operations and is leading to a correct, and usually permanently curative, surgical procedure.

TESTICULAR TRANSPLANTATION.

It is somewhat surprising that current literature bearing on the restoration of virility by the method of testicular transplantation should contain no mention of the name of Dr. G. Frank Lydston, who has not only been a pioneer on this subject, but who subjected himself to the experiment—if it may be so called—transplanting into his own scrotum the testicle of a man executed for crime and proven before his death to be free of syphilis. There has thus far been no effort made to transplant a testicle, suture its vascular and vasal connection and expect it to fulfil not only its function in maintaining or accentuating the male characteristics, but also its other biological functions of spermatogenesis and external secretion. The theory on which transplantation at present is based is to the effect that the interstitial cells, supposed to furnish an internal secretion, may be maintained in full activity, and that by means of this internal secretion, theoretically lacking in the testicles of the aged, the vitality, endurance and virility of youth may be in part restored. As an easier way of accomplishing this object vasal ligature has been suggested, since it is claimed that by this procedure the spermatogenic function of the testicle is inhibited, in consequence of which that portion of the gland concerned in internal secretion is stimulated both to greater growth and greater activity; nor are there lacking clinical records which seem to corroborate the value of both implantation and vasal ligature. Some reporters claim not only for their cases restoration of youth in so far as

feeling is concerned, but even the disappearance of wrinkles and the changing of the color of the hair from gray to dark. In so far as the microscopic studies are concerned it would seem that transplants from man to man longest exhibit their proper morphology.

Thorek (*Virginia Medical Monthly*, September, 1922) records successful transplantation from the monkey. He implants the whole testicle and states that the results are excellent. He gives neither the latter in detail nor his method, which he calls the "lantern" method, but vaguely indicates that perfect success has followed the procedure, in so far as the vitality of the transplant is concerned, and that the clinical results are entirely satisfactory.

It will be remembered that Brown-Sequard many years ago claimed that injections of what he called testiculin, made up of macerated and glycerin-extracted glands of animals, mainly bulls, produced a stimulating effect upon the nervous system and a rejuvenation in so far as sexual potency was concerned that justified the use of this preparation. Following the pronouncement of Brown-Sequard, which was suggestive and conservative rather than highly optimistic, there followed many articles by divers reporters extolling this preparation in terms of enthusiastic praise and recording clinical results which were too startling and rapid to be due to other than a profound psychic impression.

No convincing evidence has yet been adduced that the transplantation operations performed have in themselves, and because of the internal secretion conveyed to the patient, been of large service.

When we receive reports complete in all detail from such clinics as are conducted by the Mayos, by Crile, by Moynihan, by Finney, by Clark, and the other leaders in whom the profession has learned rightly to trust, we may be led to believe that there is something in the method and that its practice is advisable. No one of these leaders has yet considered the evidence sufficiently conclusive to even give the method a trial.

Considering the gullibility of the public transplantation is likely to have a large exploitation at the hands of those not fitted for either performance or interpretation.

Progress in Therapeutics

Medical Therapeutics

Flavine as a Therapeutic Agent.

GANGULI, in the *Indian Medical Gazette* for September, 1922, states that he began clinical investigations on the action of this drug in eye diseases in the beginning of 1919, and his observations on its action in conjunctivitis produced by various microorganisms were recorded in the *Indian Medical Gazette* for July, 1920. The conclusions arrived at are summarized as follows:

As the drugs used in ophthalmic practice are few in number, flavine will be a very valuable addition to our armamentarium, especially in the treatment of all kinds of mucopurulent conjunctivitis and ulcerative keratitis, caused by Koch-Weeks' bacilli or by the coccal group.

Again, most of the drugs commonly used in eye diseases cause smarting or irritation. Flavine is one of the few exceptions.

It has got a great future in operative ophthalmic practice, its antiseptic value being superior to that of any of the existing drugs.

Its curative and prophylactic value compares favorably with that of silver prepa-

rations, which are probably the most extensively used of all the drugs in ophthalmic practice.

Both proflavine and acriflavine were tried in trachoma for more than a year; it was found that acriflavine was decidedly superior to any of the existing drugs on account of its non-irritability, powerful antiseptic property, non-coagulant effect on albumin, and because it acted better in the presence of serum and tears. The results of his investigation on its use in forty cases of trachoma were published in the *Indian Medical Gazette* of July, 1921, and they were summarized as follows:

It shortens the period of treatment to an appreciable extent.

It is possible to prevent the onset of complications by systematic treatment from the beginning.

The complications are quickly brought under control and stopped from further progress.

Ganguli then deals with its application in some other eye and general diseases. In surgical opththalmic cases it is his practice to put a drop of acriflavine after an operation before applying a bandage, not because this has got any advantage over strict asepsis, but because it puts confidence in the mind of the operator about the sure protection from sepsis, which in spite of all our care is sometimes unavoidable, especially in the case of busy ophthalmic surgeons, who have to depend on assistants for preparation of patients.

Flavine was tried on six cases of dacryocystitis. Four cases were rapidly cured under alternate probing and syringing with flavine solution (1 in 4000). In the remaining two cases the improvement was not sustained and their lacrimal sacs had to be removed.

Proflavine was tried in twenty cases of suppurative keratitis of unclean progressive type with remarkably good results. It was given at first in 1-in-10,000 strength every fifteen minutes until the ulcerated parts of the cornea had acquired a yellowish tinge, when the strength was doubled and the interval increased to one hour. The slough gradually acquires a deeper yellow tinge, after which the strength is increased to 1 in 1000 and given at intervals of three to four hours.

As soon as the slough acquires a deep yellow tinge, amelioration of signs and symptoms generally ensues and the ulcer enters upon a regressive stage. After an interval which may vary considerably according to the thickness of the slough and nature of the ulcer, the slough is gradually cast off, leaving the ulcer clean. Once the ulcer is clean ordinary methods of treatment are indicated. Of course it must be understood that atropine or eserine is the sheet-anchor of our treatment in keratitis for insuring rest to the ciliary region.

In cases of torpid or indolent ulcers, it is often very difficult to stain the slough, which, even if stained, takes the stain only superficially. In these cases irritants like tincture of iodine or phenol are indicated as a preliminary to treatment with flavine.

So much for eye diseases. With regard to its administration in a few other diseases, its value in big septic wounds was fully demonstrated during the late war. Its efficacy in gonorrheal urethritis is well known. On his request, Captain Byramjee of Quetta gave a systematic trial in 10 cases of gonorrheal urethritis to acriflavine and compared its value in similar cases with potassium permanganate and silver nitrate solutions on irrigation. Abortive treatments were tried in a large number of cases alternately with acriflavine and protargol. Acriflavine was found to be decidedly superior to all the other preparations.

Application of flavine solution (1 to 1000) in ulcerative stomatitis, tonsillitis and pharyngitis is also followed by good results. A yellow film quickly covers the surface of raw ulcers, and if sloughs are already present they acquire a yellow tinge with amelioration of pain and inflammation. Healthy granulation tissue is exposed immediately after the yellow slough is cast off.

With regard to its action in burns and scalds: In the first stage, picric acid is decidedly superior to flavine, as the latter has no anesthetic property. But when shock is

over and the burning sensation is gone and the surface is denuded of its epithelium or is raw, ulcerated, and inflamed, the use of flavine is especially indicated. It assists in the formation of a yellow fibrinous coating, or slough, under which granulation tissue rapidly begins to form. Pain and inflammation of surrounding tissues quickly disappear. This yellow fibrinous slough is rapidly peeled off within a few days, leaving healthy granulation tissue beneath. Once this granulation tissue appears, flavine should be replaced by the other antiseptic drugs commonly used, for unless the dressings be kept moist the part becomes painful again.

Carbohydrates in the Nausea and Vomiting of Pregnancy.

HARDING and WATSON, in the *Lancet* of September 23, 1922, state that the therapeutic measures which they have suggested to combat nausea and vomiting of pregnancy are fourfold.

The use of carbohydrate to correct the lack of maternal hepatic glycogen should range, depending upon the severity of the condition, from an alteration of diet in the direction of increasing cereals, vegetables, and fruit in mild cases, to the use of intravenous and interstitial glucose injections in the very severe forms.

Rest in bed is essential, with isolation of cases in which the neurotic factor makes itself pronounced, and it usually does so in all but the very mild cases. As a sedative, bromides may be given by rectum in doses varying from 30 grains once in the evening to 40 to 60 grains t.i.d., depending upon the clinician's recognition of the severity of this factor and the patient's reaction to rest and isolation alone. As a general rule, however, the higher dosages are unnecessary. Their need is most evident when the patient vomits not only any fluid given by mouth, but when the vomitus begins to be in excess of this and the tissue fluids themselves supply the necessary water.

The keeping open of the bowels is useful, usually in a gentle manner, by an occasional laxative for the mild cases, and an evening laxative followed by a cleansing enema in the morning for the hospital cases.

The administration of water to correct any dehydration, and by doing so to insure the flow of all secretory and excretory fluids as far as the water factor in them is concerned. Fluids to the amount of 60 ounces are urged by mouth in all cases. Additional fluid in the severe cases will be supplied with the glucose, either by rectum or by interstitial or intravenous injection.

Harding and Watson mention three different types of treatment—mild, moderate, and severe—which are as follows:

Mild.—For three or four days leave out of diet all meat, fish, chicken, soups and broths, butter and cream. Before rising, patient is to eat an apple, banana, or a few crackers. She must eat plenty of fruit, either fresh or stewed, vegetables, salads, bread, toast, crackers, rusks. May take jams, jellies, custard, and sparingly of milk and eggs. Diet to be taken in five small meals throughout the day instead of the usual three meals. Fluids: Water, weak tea, home-made lemonade or orangeade to make up 60 ounces a day. At the end of three or four days ordinary diet may be resumed if taken in a number of small meals. Fats must be taken sparingly. Attend strictly to bowels at all times.

Moderate.—Rest in bed at once, with isolation. Any patient showing neurotic factor to be isolated in hospital. Make no attempt to feed by mouth, unless patient feels hungry and asks for food. Cleanse bowel by simple enema each morning. Give nutrient enemas of 6 to 8 ounces 10-per-cent glucose in saline t. i. d. Give very slowly by fine catheter. Murphy drip may be used if desired, but usually it is not well borne. Urge fluids by mouth to 60 ounces a day.

On subsidence of symptoms commence feeding by a little dry toast or crackers. If well borne, next day give mashed potato, a little jam or jelly with toast. Continue

to increase the diet by consecutive additions of vegetables and fruit until the diet resembles the diet in mild cases. Continue enemas until acetone bodies disappear from urine, then gradually discontinue, leaving night enema to end. Add protein to diet on disappearance of acetone bodies, starting usually with chicken or fish. Bromide, 30 grains, may be added to night enemas if indicated.

Severe.—Hospital treatment only. Strict isolation. Treatment as in moderate cases, but give either interstitial glucose, 500 cc of 10-per-cent solution in saline, or intravenous glucose, 1000 cc of 5-per-cent solution in saline, in addition to nutrient enemas, as above. Bromides up to as high as 60 grains may be added to each enema if the symptoms are very severe and the urine continues to show a high specific gravity in spite of treatment. Codeine, ½ to 1 grain, may be given subcutaneously the evening following an interstitial or intravenous injection. The interstitial injection is very painful and should not be used more than twice. It sometimes has a salutary effect upon a refractory patient.

On subsidence of symptoms the feeding follows the directions of the moderate cases.

As dieting forms such an essential part of the after-treatment of the moderate and severe cases, and as diet will entirely and rapidly control the mild nauseas and sicknesses, these authors suggest arranging a list from which the patient may select such dishes as suit her taste once she is well under control. It is important that such a choice should be exercised, as monotony of diet must be avoided, and the patient should not feel in the period of her convalescence that she is unduly restricted. They urge that a carbohydrate diet does not mean a cereal diet exclusively. It must include vegetables and fruits at least twice a day. A diet instruction sheet is given each patient when she leaves the hospital, or to each patient when her morning sickness is under control, with a more exclusive carbohydrate diet.

Immunization Against Measles.

HERRMAN, in the *Archives of Pediatrics* for September, 1922, states that one attack of measles protects the patient against future attacks. This it does by virtue of immune bodies developed in the blood during the course of the disease. The method of prophylactic inoculation is briefly as follows: One week after defervescence from measles—that is, about ten days after the appearance of the eruption—from 60 to 80 cc of blood is withdrawn from the vein of an otherwise healthy child over three years of age. The serum is separated, a small portion is subjected to the Wassermann test, and a small quantity of tricresol is added to the remainder, as a preservative. If possible, the serum of several patients is mixed. The material is kept in sealed vessels, in a cool place. For prophylactic inoculation from 3 to 6 cc of the serum is injected intramuscularly not later than the fourth day of the incubation period, which is usually the second day from the appearance of the eruption in the primary infecting individual. The chief objection to this method is that it confers a passive immunity which lasts only about eight weeks, and that this immunity is not absolute for that length of time, as the following published reports demonstrate:

Torday	261	prophylactic inoculations	with	15	failures.
Manchot	155	"	"	11	"
Kutter	145	"	"	6	"
Kleinschmidt.	60	"	"	2	"
McNeal	 16	"	"	4	"

That is, in a total of 637 inoculations, 38, or about 6 per cent, failed to protect. The method has only a limited application, namely, in asylums, and other institutions for the care of infants and young children, where, when a case of measles occurs, the remaining children may be given prophylactic injections. As Reitschel has pointed out it is difficult to obtain a sufficient amount of blood from convalescent children, especially when the parents' consent must be obtained. In such cases he believes a simpler plan would be to use the blood of one or both parents, and if time allowed, its potency could be increased by inoculat-

ing them with measles virus a week or ten days before withdrawing their blood.

The prophylactic inoculation with convalescent serum, of children who are known to have been exposed to infection with measles, is only a very small contribution to the solution of the measles problem. Outside of institutions the vast majority of children are infected at a time when no one suspects the danger.

In April, 1914, Herrman began to inoculate against measles. The method depends on the following facts:

Seventy-five per cent of the deaths from measles occur in infants under two years of age, and ninety per cent under five years. Any method of immunization which aims to control or eradicate the disease must be employed in early infancy on all or nearly all children.

Infants, whose mothers have had measles, are relatively immune to the disease during the first five months of life. This immunity gradually disappears, but in many it persists for six to eight months. The immune bodies in the mother's blood are probably conveyed to the fetus through the placental circulation. Artificially fed, as well as breast fed, infants enjoy this relative immunity. It is not conveyed to any great extent through the breast milk, for infants of six or more months, who are still nursed, are just as susceptible as artificially fed infants. He always believed that this relative immunity of infants under five months was an accepted fact. In a paper which he published in 1914 he stated that he had notes of 40 consecutive cases of infants under five months who did not contract measles although they came in very intimate contact with patients, such contact as occurs in the tenements, often lying in the same bed. Since that time he has collected a very much larger number of such cases. In several discussions he stated that he had inoculated 150 infants under five months with the measles virus, and that not a single one had developed a typical attack of measles. One would suppose that this was sufficient evidence that such infants were relatively immune. He was therefore not a little surprised to read in a recently published paper by McNeal: "Herrman attempted to convert the *supposed* temporary immunity of infants under 5 months . . ."

In measles the infectious material is regularly present in an active form in the nasal discharge from twenty-four to forty-eight hours before the eruption appears.

It is not necessary to isolate and identify the infectious material, or to obtain its growth in pure culture, in order to immunize against the disease.

In measles, as it occurs in practice, the infectious material is conveyed usually from the nasal mucous membrane of the patient to the nasal mucous membrane of the child infected.

The immunizing inoculations follow the same path. The nasal mucous discharge of patients, free from other diseases, is taken from twenty-four to forty-eight hours before the appearance of the eruption. It is mixed with a small quantity of normal saline solution, and bacteria and other extraneous material separated by centrifugalization. If passed through a Berkefeld filter, the microörganisms are eliminated, but the virus loses some of its potency and cannot be depended upon for the purpose of immunization. A little tricresol is added as a preservative. A few drops of this solution are applied to the nasal mucous membrane of the infant to be immunized. Only healthy infants between four and five months are inoculated. The method endeavors to convert the temporary relative immunity into an immunity which persists during the first few years, that is during the period when the disease is most dangerous. He has found that the best results are obtained when there is some reaction following the inoculation. This consists of a slight rise of temperature on the eighth to the sixteenth day; occasionally a few spots on the face or body. It is, therefore, advisable to inoculate as near as possible to the end of the fifth month.

The chief objection raised to the method has been that a susceptible infant might be

inoculated and develop the disease in a severe form. If only healthy infants, whose mothers have had measles, are immunized there is no danger. In 165 inoculations he has not had a single case which exhibited any unfavorable effect.

One hundred and sixty-five infants have been inoculated in the fifth month. Of these, 75 have been followed for from four to eight years. Of the 75, only five have contracted measles, and 70 have remained free. Of the latter, 45 have been directly exposed to infection, 17 by contact with infected children in their own family, 28 by contact with children living in the same house. In 84 of the 165 inoculated there was a definite reaction, a rise of temperature on the eighth to the sixteenth day, with or without a few spots on the face or body. He has no doubt that if all the infants could have been constantly observed, a larger number would have shown a reaction. None of those showing a distinct reaction contracted the disease. Thirty-six of those inoculated, with a reaction following, were reinoculated after an interval of at least six months, and none developed the disease.

Autogenous Vaccines.

The *British Medical Journal* of September 23, 1922, in an editorial on this subject, makes reference to an article based on much practical experience by Parisot and Simonin of Nancy, in which they review the present position of autogenous vaccines, and specially consider the reasons why this form of treatment, though logically the correct one, has not been crowned with the success that might have been anticipated. Thus it is mainly in chronic staphylococcic infections that good results have been obtained, and even these are not constant, and are often less satisfactory than those given in response to stock vaccines; then, again, most striking cures have followed the almost haphazard employment of vaccines, sometimes even composed of microörganisms other than those responsible for the disease. It has, therefore, been thought that it is unnecessary to take the time and trouble involved in the preparation of an autogenous vaccine when almost any vaccine will give equally good results.

The reasons for this erroneous opinion are fully considered. As Delbet, Beauvy, and Girode pointed out in 1914 in connection with the vaccine treatment of local surgical lesions, two very different effects may follow the injection of a vaccine; there is an immediate non-specific reaction due to colloidoclasic or protein shock, which accounts for the remarkable successes of vaccines in some acute infections; and secondly, a delayed reaction due to the specific action of the microbes contained in the vaccine. It is therefore important to distinguish between bacterial protein shock and vaccine treatment, and to refer correctly to each of these factors the good and bad effects that may occur after the injection of a vaccine.

The mistakes and considerable difficulties in the technique of the preparation and administration of autogenous vaccines have been responsible for much of the failure of autogenous vaccines. Parisot and Simonin, therefore, after describing the details of making an autogenous vaccine, indicate the fallacies that may arise, such as failure to cultivate the responsible microörganism from the use of an unsuitable medium, the difficulty of choice, and the changing character of the microbes in mixed infections, and draw attention to the importance of avoiding too high a temperature in sterilizing the cultures, and to the deterioration of vaccines on keeping. The administration of the vaccine demands meticulous care and a close watch over the reactions of the patient, so as to give the proper doses at the appropriate intervals and to suspend further treatment when contraindications appear. If vaccines are given without this care serious and even grave accidents may occur; among these is protein shock, which, though it may be beneficial, is not part of or necessarily favorable in vaccine therapy. It is therefore advisable that the vaccine should consist of carefully washed microorganisms, thus excluding the complex products of the culture medium.

An excessive reaction, especially at the site of the injection, where considerable increase in the inflammation and swelling occurs, is often due to a transient state of diminished resistance, corresponding to Sir Almroth Wright's negative phase; in these circumstances another injection of vaccine, if given prematurely, may induce severe symptoms, and, although the vaccine is perfectly sterile, give rise to a fixation abscess at the site of injection. On the other hand, a certain amount of increased activity and exudation in the infected focus, not only at the outset of treatment, but also after several injections have been well borne, is a favorable sign. Thus in chronic gleet and pulmonary suppuration the first evidence of improvement may be ushered in by increased secretion of mucus, and in cutaneous staphylococcic infections there may, after a number of doses of an autogenous vaccine, be a sudden outburst of small pustules around the original focus, which rapidly disappear and are followed by improvement. Sometimes the fourth or fifth dose of the vaccine is followed by phlegmonous infiltration without fever around the site of the injection; this is Arthus's phenomenon due to local anaphylaxis. The authors are definitely of opinion that except in those that run a rapid course all infections, acute or chronic, local or generalized, can be benefited by autogenous vaccine treatment.

The Modern Treatment of the Weak or Flat Foot.

In the *California State Journal of Medicine* for October, 1922, McCHESNEY states that the first measure is to remove the load or a part of it; the second is to strengthen the elements of the arch itself, not prop it up. To remove the load, he insists on two things: first, proper posture; second, raised inner sides of shoes. In almost all cases of arch strain the line of weight passes down the tibiæ to the inner sides of the feet. Usually it can be demonstrated to the patient standing, and also to the friends or relatives observing from the rear, that the line of weight passes down to the inner side of the everted os calcis. If the os calcis is everted, the rest of the foot is everted, as it is an axiom in orthopedics that the way the os calcis goes the rest of the foot goes. This, then, means that the greater part of the body weight is upon the inner side of the foot, or the internal longitudinal arch, instead of upon the external longitudinal arch or outer side of the foot, which is almost flat, and is intended to bear the bulk of the weight, leaving the internal longitudinal arch free for its function of a spring.

This latter result can be partially brought about by insisting upon the proper posture —*i. e.*, by standing and walking with the feet parallel and not toed out, Charlie Chaplin style, as we have been taught to do by our mothers, teachers, dancing-school teachers, military instructors, etc., from time immemorial. In addition, high laced shoes, not Oxfords, with the inner sides of soles and heels raised one-quarter inch in average, and three-eighths of an inch in severe cases, are ordered. It is his practice to measure and inspect these alterations before the shoes are worn, as cobblers are careless and have to be checked up at all times. The shoes are then tried on and the line of weight-bearing through the foot to the ground again noted, especially from the rear through the os calcis.

These simple measures are usually sufficient to remove the principal load from the overstrained arch. The fault has often been committed of not building up the shoes enough. Very rarely is one-eighth of an inch raise enough. He finds one-quarter inch not too much even for children where it is a routine measure, and three-eighths is often necessary in severe cases in adults. Some strain of the peroneal tendons or the external lateral ligament of the ankle-joint may be felt for a few days, but soon disappears. It rarely requires adhesive strapping.

The second mechanical or engineering measure employed is the strengthening of the arch components; which here means

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exercise to strengthen the muscles and ligaments that hold up the arch. The following are two simple exercises: First, inverting the feet while standing, or balancing upon the outer edges of the feet; and second, rising upon the toes and then slowly coming down upon the outer edges of the feet to the outer edges of the heels. These exercises should be done as often as possible or practicable, and it is always emphasized that upon the faithfulness with which these exercises are done depends the speed of the cure and the cessation of the need for building up the shoes. There are no new features about these exercises. They are designed, of course, to strengthen principally the tibialis anticus and posticus muscles, which are the ones principally involved, especially the latter, which exert a direct upward pull upon the head of the astragalus. As the muscles of the foot are designed to do their principal work while the individual is walking or standing, exercises are of the most value while in the weight-bearing position, and exercises while sitting do not give the arch-supporting muscles enough to do. This is an important point, and explains why exercises while sitting often do little good and, in fact, may tire the legs excessively from the unnatural work the muscles are called upon to do.

With these simple measures immediate relief is afforded to all but the most acute cases of arch strain, and these are really better off in bed till the acute symptoms subside. Arch supports may get them up a little sooner, but far from cured. In fact, the chief mistake in the use of plates, aside from the using of them at all, is the wearing them far too long. Instead of being provided as a very temporary appliance and to be supplanted by other measures as soon as possible, they are put on as a permanent curative device and no time limit set upon their use. Consequently very soon the patient finds out for himself that he is just as comfortable without arch supports as with them, and not really comfortable in either case—hence not cured.

The softer the material used, the less the discomfort and damage to the arch-supporting structures, but the same inherent objection applies to all—*i. e.*, they do not tend to restore to the arch its proper function, that of a spring. Hence they are not a bit curative and only sometimes palliative.

He has found that this method of treatment applies to the very young as well as to the adult, but sometimes the advanced in years, with arthritis, will not tolerate a changed line of weight-bearing and are better off with soft pads under the arch to distribute the weight on the tender feet, and any idea of restoring the spring action of the arch is hardly advisable on account of the age of the patient.

Treatment of Botulism: The Supply of Antitoxic Serum.

In the *Lancet* of September 30, 1922, in an editorial on this subject, it is stated that the only remedy at present known for botulism is botulinus antitoxin given by injection, and even this is unlikely to save life if the disease has progressed to a late stage. It is, therefore, of the greatest importance to *give the antitoxin at the earliest possible moment—i. e.*, as soon as the earliest symptoms of blurred or double vision, giddiness, ptosis, difficulty in speech or swallowing, etc., suggest the diagnosis of botulism.

The effectiveness of treatment by antitoxin for botulism is so greatly increased by intravenous injection that this method of administration should always be employed if possible (otherwise the intramuscular method should be used). The risk of serious symptoms arising in persons highly sensitive to horse serum must be recognized, and when, in the judgment of the medical practitioner, such risk is likely to be great, he should administer a preliminary injection of a small quantity of the antitoxin (0.5 cc=8 minims) subcutaneously. If this produces clear evidence that the patient is sensitive (that is, if a reaction appears in half an hour), then the antitoxin must be given with particular caution, the first intravenous injection consisting of 0.5 cc of antitoxin being diluted with 50 cc of

saline, and subsequent injections being diluted less and less till the full dose has been administered.

Only large doses will save acute cases. The intravenous dose should be from 20-50 cc of the antitoxin, previously warmed to body temperature, and injected very slowly. This amount may be repeated daily if necessary.

It is advised that all other persons who have consumed the suspected food, but have not yet presented symptoms, should be given a prophylactic dose of antitoxin—*i. e.*, 10 cc—intramuscularly, to be followed by larger doses intravenously should symptoms appear.

The Treatment of Eclampsia.

In the Section of Obstetrics and Gyneology at the recent meeting of the British Medical Association, a report of which appears in the *Lancet* of September 30, 1922, EDEN, in introducing the discussion, states that the importance of this subject might be gauged from the fact that 450 young mothers in their first pregnancies die in England every year from this disease. He gave an historical summary of the treatment of eclampsia, indicating the steps by which the two present antagonistic schools of treatment had been arrived at. The expectant school, amply justified by the work of Stroganoff with his 8-per-cent mortality, is most ably represented in England by the Dublin methods of Hastings Tweedy. The interruptive school, whose methods include ordinary induction of labor, accouchement forcé, and Cæsarean section, had quite as many followers. The pathologists had studied eclampsia with great thoroughness, but their results had done very little to produce improvements in our treatment. The time has come when clinicians must review the results of the methods of treatment now employed, and, after analysis, recommend to the profession the line which appears to offer the greatest hope of success.

At Liverpool this year the obstetricians reviewed the records of 2000 cases of eclampsia treated in hospitals, including 1800 cases from Great Britain and 200 from Ireland. It was remarkable that the Irish cases showed a mortality of only 10.25 per cent, whereas the others showed a mortality of 23 per cent. From these analyses several general principles emerged: (1) Eclampsia is a much easier disease to prevent than to cure. The premonitory symptoms are very definite and easily recognized provided the patient attends her physician throughout her pregnancy. An increase in the severity of these symptoms usually responds to immediate treatment with the patient still in her own home. Sometimes, however, these symptoms become so urgent that induction of labor has to be carried out. (2) As soon as the first fit occurs the patient should be removed to the hospital without delay. Country patients must be sent by ambulance. By this time the patient requires constant skilled supervision, aided by the close coöperation of the laboratory. (3) The cases should be carefully classified. The best criteria for this purpose are (*a*) the amount of albumin in the urine, (*b*) the number and frequency of the fits, and (*c*) the mental condition of the patient; and these three factors must be considered together. As severe cases must be regarded those in which the urine becomes solid on boiling, in which over ten fits have occurred, and the patient is in a state of coma. The mortality in such cases is five times as great as in the milder cases, and the method of treatment depends on whether the case is mild or severe. (4) In all cases of eclampsia the minimum amount of obstetric interference should be carried out. As justifiable procedures might be instanced induction of labor and the application of low forceps. The results of those precedures are much better than those of Cæsarean section, and very much better than those of accouchment forcé. In 420 mild cases induction and low forceps had a mortality of 5.2 per cent, Cæsarean section 9.8 per cent, and accouchement forcé 25 per cent. In 161 severe cases, those same lines of treatment

showed mortality of 26.3, 43.2, and 60 per cent respectively. (5) The simplest medical methods give the best results. Many of the recorded cases showed a plurality of treatment that would have proved a great strain even to a healthy woman. The Dublin method has proved very satisfactory. It requires (*a*) constant supervision by nurse and doctor; (*b*) the administration of water only, except in cases of coma when not even that should be given; (*c*) washing out the stomach; (*d*) lavage of the colon, as much as a gallon of fluid being used; (*e*) saline purgatives left in the stomach and colon; (*f*) no obstetric interference until the end of the second stage; (*g*) the administration of morphia in ¼-gr. doses up to a total dose of 1½ gr. Such treatment has proved very successful for mild cases. In severe cases the Dublin method should be amplified by induction of labor if the patient is not in labor, by the use of veratrone if the blood-pressure is high, and by the freer use of morphia if the fits are frequent and severe.

The Tungsten Incandescent Electric Lamp Used as a Therapeutic Agent.

WOODBURY, in the *New York Medical Journal and Medical Record* of October 4, 1922, states that there is but slight direct bactericidal effect from the tungsten lamp owing to the absence of ultraviolet rays and the paucity of blue-violet rays, but there is a decided indirect bactericidal effect upon infected parts due to the increased supply of blood to the focus which is Nature's own antiseptic, an increased vitality of the affected cells due to the same source of succor, and a slight fluorescence of the blood serum which is germicidal. When specific germicides such as the antisyphilitic drugs are administered the lethal effect of the drug is heightened and the cure augmented. In chronic or cachectic states where the infection is disseminated general illumination is harmful. Skin infections do not do so well as under blue or ultraviolet light alone, and the exanthemata do not do well; they are made worse by illumination unless all rays above the orange are excluded. In such cases semi-darkness is just as advantageous as red light for smallpox and scarlet fever patients, since the object is exclusion of the higher light frequencies which are irritating to the skin.

Based upon the reasons given the following conditions are assisted by this form of treatment:

1. Lowered nutrition, altered endocrine balance, acidosis, rickets, osteomalacia, etc.

2. Conditions of suboxidation, as obesity, lithiasis, gout, rheumatic joints, diabetes, myositis, etc.

3. Altered blood picture essential or secondary, as anemia, chlorosis, malaria, etc.

4. Nervous conditions due to faulty metabolism or altered functions of other than cerebral cells, hysteria, paralysis following acute anterior poliomyelitis or diphtheria or lead poisoning, tabes, toxic insanities, neuralgia and neuritis, insomnia, psychasthenia and neurasthenia.

5. Respiratory congestion, inflammation, and altered function, as asthma, bronchitis, pneumonia (in the beginning stages), and incipient tuberculosis.

6. All conditions connected with sluggish blood stream, where congestion is the marked feature of the complaint, as hepatic and splanchnic and coronary congestion, varicosities, gangrene and vasoconstrictions of toxic or neural origin, threatened apoplexy, and right heart embarrassment.

7. All kidney conditions where reduced urine output threatens life.

8. Ulcers, wounds and trophic impairment of tissues and to aid wound repair, graft union, and reduce scarring.

9. Osteomyelitis and periosteitis.

10. Toxemias due to faulty elimination, occupational absorption, drug habits, intestinal stasis, etc.

These are given as general indications without going into details.

When we are desirous of affecting a focal point of pathology it is often very advantageous to invoke the aid afforded by the physiological stimulation of adjacent

tissues, and in these cases the tungsten lamps are used in groups or clusters, with or without reflectors as desired. For example, a number of lamps are connected in series on an extension cord for attachment to a lamp socket or wall plug. The group is then suspended from the arches of an ordinary bed cradle over which is thrown a sheet for a reflector. A piece of tin, cut and bent, to cover over the cradle would improve the reflection. The amount of irradiation can be controlled by screwing or unscrewing the lamps in their sockets. Reflectors increase the heat waves.

The regional light application is useful in circumscribed areas of tissue stasis or leakage or of inflammation, particularly traumatic inflammation, as contusions, exudations, sprains, inflamed joints, pleurisy, lumbago, neuralgias, chronic ulcer, indolent or infected wounds, grafts, and scars. The essential value lying in continuous application of the light for extended periods or until improvement is assured or cure obtained, which may take days and in some cases weeks. In such case provision must be made to prevent discomfort from long-continued posture and the depression that would come from too free perspiration, as well as to guard against bed-sore formation. The light must always fall upon the bare skin, which is near enough to be comfortably warmed. Ventilation of the cradle is essential, and an electric fan can be used, but not if the surface be perspiring.

The Hot-air Mineral Oil Treatment of Extensive Burns.

In the *New York Medical Journal and Medical Record* of October 4, 1922, STEEL states that from earliest times vegetable oils and animal fats have been employed locally in the treatment of extensive burns. When used as occlusive dressings they tend to decompose and encourage suppuration, and in recent years surgical opinion has been strongly opposed to their employment. As olive oil was discarded, antiseptics were tried; but it was found that chemicals applied over a long period of time to a burned surface produced hard, contracting scars.

Then came the continuous hot-water bath, which gave excellent results; but the specially devised tanks necessary for its employment excluded it as a routine procedure.

The recent introduction of paraffin preparations which do not decompose and which are employed clinically, as ambrine, paraffin wax, and mineral oil, will probably supersede other dressings. The advantages of the paraffin preparations are that they limit pus formation and cause no local irritation.

The only advances made in the local treatment of burns for perhaps a century have been the continuous hot-water bath and the paraffin preparations. He has endeavored to combine these advances and simplify them by substituting hot air for the hot water and mineral oil for the paraffin wax. The following technique which he has used routinely for the past eight years has given encouraging results:

The patient receives in the treatment of the stage of shock liberal hypodermic doses of morphine. After pain is relieved, he removes the burning clothing, first soaking well with normal salt solution. If tar or molten metal is adherent to the tissues, he does not remove it.

He sprays the whole burned area with mineral oil without applying any other dressing, and places a gauze pad under the body, below the burned area. He then places over the whole body, from the neck to beyond the feet, a metal frame covered by a sheet, and hangs one or two electric light bulbs from the roof of the frame of sufficient power to keep the temperature at 105° F. The patient is kept in the hot-air bath during the whole course of treatment, and disturbed as little as possible.

In the treatment of the stage of auto-intoxication Steel says that excessive toxemia may require saline by Murphy drip or hypodermically to aid elimination. Saline is not used routinely, and is rarely necessary. Locally the burned areas are sprayed three times daily with mineral oil. The gauze pad under the back, below the burned area, is changed once daily. The patient

adjusts himself under the cradle in any comfortable position.

In the stage of suppuration but little pus appears with this plan of treatment. The burned skin and any adherent material separate in about one week, and fall off or are picked off without pain. The exuded serum from the raw surface forms lumpy, irregular soft crusts with the oil, which separate spontaneously or are picked off every second day. These soft crumbling crusts give the wound an ugly look, but should not cause any anxiety.

During the stage of repair the newly formed skin has not the dark-red, keloid character often seen after repair of suppurating surfaces. The scar is comparatively soft and flexible.

The scar tissue is much less than by many other methods and does not have the tendency to contract; so that disfigurement and loss of function are largely eliminated.

A prophylactic dose of tetanus antitoxin is given routinely on admission. Appropriate eliminative measures are carried out and the diet regulated according to the systemic condition.

Face burns receive the same general treatment with the exception of the hot-air bath. No occlusive dressing is used.

This plan of treatment meets the requirements of the extensive second-degree burn usually encountered in civil and industrial practice. Deep charring of tissue or burns of special regions must be treated by applying the recognized principles of surgery to the special condition. Overwhelming shock or autointoxication is met by appropriate measures, of which transfusion of blood and alkaline solution gives the best results. Joint contractures and facial distortions must be corrected by those plastic methods which the abundant experience of the late war has systematized and perfected.

The advantages of this plan of treatment are:

Its simplicity, for no special or expensive apparatus is necessary.

The patient is subjected to the minimum amount of disturbance and handling.

The dressing is applied by the nurse and takes but one to two minutes three times daily.

Relief from pain is marked; suppuration is greatly diminished; and stench is abolished.

The wound heals with the minimum amount of scar tissue and disfigurement.

It is a cheap, simple, efficient, labor-saving plan, giving as good results as the much exploited closed paraffin methods.

The Treatment of Dehydration in Infants.

In the *Boston Medical and Surgical Journal* of September 21, 1922, SCHLOSS reports that the treatment as he applies it to cases of severe dehydration is as follows: The patient is given a subcutaneous or intraperitoneal injection of saline or Ringer's solution, and within one hour an intravenous injection of a 10-per-cent glucose solution. The amount of isotonic saline or Ringer's solution to be given varies with the size of the infant, the usual amounts by subcutaneous injection varying from 80 to 300 cc, by intraperitoneal injection from 125 to 400 cc. Twenty cc of 10-per-cent glucose solution per kilo of body weight is the amount which is usually given. It is important that the glucose be given within a short time after the saline. It is of greatest importance, especially if the dehydration is at all marked, that an isotonic solution be given before the glucose; otherwise the treatment does no good and may do harm. An important precaution in the preparation of the glucose solution is that it should be absolutely clear. A precipitate, even in small amount, may produce marked and even serious reactions.

The treatment outlined may be repeated in five to six hours if necessary, the necessity to be judged by the condition of the skin and the general symptoms. Usually two or three injections of the glucose solution are sufficient. After improvement is pronounced the glucose injections may be omitted, and occasional subcutaneous in-

jections of normal saline are often sufficient to maintain the normal water content of the organism.

The effect of this plan of giving fluid is usually pronounced. There is an early secretion of urine, the condition of the skin becomes normal, and the general symptoms rapidly disappear. Due to the removal of its cause, the acidosis is corrected, so that the use of alkali is entirely unnecessary.

Congenital Hypertrophic Pyloric Stenosis and its Treatment by Atropine.

HAAS, in the *Journal of the American Medical Association* of October 14, 1922, in summarizing his article, states:

1. Uncertainty of etiology is the cause of differences in treatment.

2. Medical treatment was formerly practiced until the success of the Rammstedt operation caused surgery to be advocated exclusively.

3. To see and feel a pyloric tumor, with complete stenosis, and observe its histologic picture of hypertrophy of muscle fibers, makes credence of any other view difficult.

4. The problem is nevertheless a medical one, and atropine is practically a specific.

5. Pyloric stenosis is only an advanced degree of pylorospasm.

6. It is only a single manifestation of a general hypertonic state whose etiologic factor is an overaction of the vagus portion of the autonomic nervous system. There is usually a hyperexcitability of all motor functions.

7. This condition has been variously described as the hypertonic infant, myotonia, myotonia spastica perstans, arthrogryposis, essential contractures, pseudo-tetanus, tetanoid conditions, infantile tetany, spasmophilia, and vagotonia.

8. Experimental work supports this point of view.

9. Further support is found in reports of cure by other than surgical methods.

10. Differential diagnosis between pylorospasm and pyloric stenosis is practically impossible.

11. The symptoms of pyloric stenosis are projectile vomiting, visible peristalsis, constipation, starvation stools, rapid loss of weight, and pyloric tumor.

12. Closer observation will reveal, as well, pallor; lividity; loss of turgor; circumoral cyanosis; cold, clammy, cyanotic hands and feet; subnormal temperature, unless obscured by starvation elevation; and spasm not only of the pylorus but often of the larynx, pharynx, esophagus, cardia, and various portions of the intestine. There is also hypertonicity of the skeletal musculature.

13. Irritation of the infant nervous system produces an effect predominantly stimulating. An inhibiting effect is virtually absent.

14. In the treatment, certain points should be observed:

(*a*) Errors in diet or hygiene must be corrected.

(*b*) In every advanced case, saline solution should be given subcutaneously at frequent intervals until enough fluid can be taken by mouth to supply body needs.

(*c*) Atropine, like digitalis, must be active—that is, it must be freshly prepared from the crystals. Once in solution, deterioration is rapid.

(*d*) In the milder cases the drug may be given by mouth, in the bottle, or, if the patient is breast-fed, in a teaspoonful of water before feeding.

(*e*) In the severe cases the drug should be administered hypodermically until vomiting is controlled.

(*f*) The dose is variable, 1/1000 grain (or even 1/2000 grain in rare instances) at each feeding to a maximum which either controls symptoms or produces the physiologic effect, *i. e.*, flushing, etc. The largest dose he used was 16/1000 grain at each feeding, or ⅛ grain in twenty-four hours. Beginning with 1/1000 grain, one should increase the amount at each feeding until the result is obtained, when the dose becomes fixed.

(*g*) Treatment may need to be given only a few weeks, or may be required most of the first year.

(*h*) There are rare cases in which much smaller doses are required to begin with.

15. Occasionally, constipation with severe rectal tenesmus results. The omission of a few doses of atropine relieves this.

16. Infants of this type are practically immune to the harmful effects of atropine.

17. This paper is based on an experience of more than forty cases ranging from a mild spasm to complete stenosis. One of the patients died suddenly; another discontinued treatment and was successfully operated on. The others recovered under atropine treatment, although at least 20 per cent had been advised that operation would be required.

18. In an illustrative case of so-called congenital pyloric stenosis with complete obstruction, the patient was cured by atropine.

19. Hypertrophic pyloric stenosis is a symptom of the hypertonic infant. It is only an advanced degree of pylorospasm. Most if not all cases can be cured by sufficient doses of atropine correctly administered.

Factors in Dyspepsia.

PALFREY, in the *Boston Medical and Surgical Journal* of October 12, 1922, states that the details of the treatment in the five different types of the disorder which he mentions must vary somewhat in each individual case.

First, as to the group which he has attributed to irritability, perhaps hyperemia, of the lining of the stomach, due to irritants ingested or perhaps sometimes to catarrhal inflammation. Here the key-note is to put a stop to the irritation. In severer cases in which some of the irritant may be still in the stomach, vomiting should be encouraged by giving warm water, or the stomach may be washed out; then the stomach should be rested by a fast of from twelve to twenty-four hours or more, in which nothing but sips of water or cracked ice are taken. If vomiting is violent after the stomach is empty a small hypodermic of morphine or atropine may be given. But the requests and suggestions of friends that various things be given by mouth "to stop the vomiting" are best rejected. He suspects that there is a stage, if we could recognize it, in the subsidence of these irritations in which mild stimulation, as by certain foods, by capsicum, nux vomica, ginger, or champagne, may do good. But he is convinced that in practice these more often do harm by increasing and prolonging an irritation that would have subsided sooner under simple rest and starvation. Returning appetite is commonly an indication that feeding may be resumed with milk and lime water in small amounts, then gruels, milk-toast, etc., up to a normal child's diet, and then on to a simple adult diet, with cautions against return to the indiscretions which caused the original disorder. In mild or chronic cases restriction to a simple diet of limited amount, without fried foods, pastry, or strong flavorings, and enforcement of mastication, may be sufficient.

Second, as to the group of depressed gastric functions. One of the strongest hints as to the line of attack in these is the very striking improvement that often occurs in these patients if they can be given a complete change of scene or vacation in congenial surroundings. Most cases when they apply for treatment are in a state of discouragement and maladjustment to their environment from which they see no way out. Many difficult situations are presented, but it is generally true that more can be accomplished by encouragement, and improvement of the general circumstances of daily life, both mental and physical, than by diet and drugs. In diet the most important point is to be sure that the patient has his meals at regular hours at a good home or boarding-house table and eats moderately of what is provided, resisting the opposing temptations either to omit meals or to eat irregularly between meals. Of drugs, nux vomica, with a little dilute hydrochloric acid before meals, sometimes works well as a temporary expedient.

Hypersecretion with pylorospasm, failing more exact knowledge, we have to set

down as a neurosis of secretion and contraction, or a reflex of unknown source. On this basis and on empirical grounds treatment should attempt to provide for a calm state of mind during meals and during their digestion; slow, moderate eating, with thorough mastication, and avoidance of articles which are believed to stimulate acid secretion, notably spices, meat flavorings, and products of frying. Sometimes the attack seems to be directly precipitated by strongly acid drinks, so these should be particularly warned against. Belladonna and atropine seem to be of value. In attacks, milk of magnesia or sodium bicarbonate should be given freely, and if the spontaneous relief from vomiting is delayed, the stomach may have to be washed out.

Fourth, the group called hyperacidity, with heartburn and desire for more rapid emptying. Cases of this group are to be suspected of ulcer, according to their duration, severity, and obstinacy, and, if their symptoms are sufficiently severe, should be put to bed and given one of the accepted gastric ulcer diets even though the special tests of the laboratory and *x*-ray fail to give a positive diagnosis. Milder cases may be given merely a small bland diet at meal-times with crackers and milk at 11, 5, and 10. In all cases, whenever symptoms are present they should be controlled as promptly as possible by magnesium oxide, milk of magnesia, or sodium bicarbonate. Where magnesium oxide preparations have the necessary effect they are preferable for frequent use to sodium bicarbonate. But in most cases which obtain temporary relief from these agents which neutralize acid (even including some cases of ulcer) he has found that much can be done to prevent the recurrence of symptoms by giving preparations of ox-bile in enteric-coated tablets with the object of increasing the flow of bile. Perhaps the most important practical point that he has to offer is that one can make many patients with sour stomachs and heartburn grateful by giving them this bile treatment. Satisfactory preparations are glycotauro tablets of Hynson, Westcott & Dunning, and ox-bile tabloids of Burroughs, Wellcome & Company. Three tablets should be given three times a day before meals, or nine a day, for a week, then reducing. At the same time it is well to urge thorough mastication and a moderately conservative diet without alcohol, but closer restrictions in mild or early cases are unnecessary. In patients who obtain temporary relief from milk of magnesia one can be fairly confident that this treatment will give more permanent relief.

Fifth, in cases of valvular cardiac orifice or difficult belching. Not knowing the exact mechanism, we have no direct method of treating the orifice. Our object, therefore, should be to diminish the need of belching by reducing, so far as possible, the variations of intragastric pressure. This is best done by providing a diet supplying the necessary food value in small bulk, and the day's total should be divided between six meals instead of three at appropriate intervals. All should be eaten slowly and masticated thoroughly. Excitement, which some patients find to increase their sense of epigastric pressure, should be avoided. Patients should be persuaded to restrain all voluntary attempts to belch, and to break the habit of cribbing, which some have without being conscious of it. Irritant dyspepsia medicines should be stopped, but milk of magnesia and enteric-coated bile tablets may be used if there are associated hyperacidity symptoms.

Combinations of the above-mentioned sources of symptoms should be treated by appropriate combinations of treatment.

Finally, there are certain general facts that seem to him worth mentioning for their bearing upon the management of cases of dyspepsia of various types. Most chronically disordered stomachs can still receive without symptoms most of the articles of a normal diet if only these are taken with thorough mastication in sufficiently small amounts. Patients in managing their own diets commonly have their attention too much fixed upon *what* they can eat, and pay too little attention to the amounts.

Most dyspeptic patients are impatient and meddlesome with their stomachs, rather than gentle and systematic, and so become confused and discouraged. Osler mentions 3¼ ounces of meat, two medium slices of stale bread, and one ounce of butter three times a day as a useful diet in hyperacidity. Smaller amounts of the same foods can be taken by most dyspeptic patients, and it often serves as an encouraging introduction to treatment to show the patient that he can take even small amounts of these substantial foods which he may formerly have feared, giving him reason to hope that he may gradually resume a normal diet.

An Appraisal of Ovarian Therapy.

Novak, in *Endocrinology* for September, 1922, states that it is unfortunate that most of the indications for ovarian therapy are of the subjective variety. Clinical results alone are obviously less reliable than would be the case if it were possible to control them by animal experimentation. The more conservative element in the medical profession has within recent years frowned upon the practice of proprietary medicine manufacturers of bolstering up their claims by means of "clinical reports" as to the therapeutic virtues of their preparations. However absurd these claims might seem be be, the graphophonic detail man could meet every objection by the stock argument that "after all, doctor, it is results that count," as if equally brilliant results could not be obtained, in many subjective disorders, by patent medicines of the most flagrant sort or by bread pills alone. The only difference between the innumerable patent medicine testimonials found in newspapers and many so-called "clinical reports" is that in the one instance the gullibility of the laity is displayed and in the other the credulity of the equally human medical profession. He hopes that these remarks will not be misunderstood, for he does not discount the unquestioned value of honest clinical observation carried out in a really scientific truth-seeking spirit. To the clinician we are, as a matter of fact, indebted for some of the most important contributions to endocrinology. For the most part, however, we must look to the laboratory worker for the really substantial advances in this field of work.

Among the conditions for which ovarian extracts have been recommended may be mentioned amenorrhea, functional uterine bleeding, dysmenorrhea, infantilism of the generative organs, the vasomotor and nervous disturbances of the menopause, sterility, obesity, repeated abortion, vomiting of pregnancy, pruritus vulvæ, kraurosis vulvæ, deficient mammary secretion, epilepsy, and Graves's disease. To these might be added quite a number of others even more illogical than some enumerated. Only a few of these have any claim whatsoever to serious consideration.

The use of ovarian extracts would appear to be a rational procedure in the treatment of amenorrhea of the so-called functional type, especially that seen so commonly in association with the adiposegenital syndrome. Novak has treated many such cases with extract of whole ovary and many with corpus luteum extract, and has not been able to convince himself that the patients have derived any very great benefit. This is especially true when these extracts are given alone—*i. e.*, when they are not combined with pituitary or thyroid extracts. In the latter case he has at times obtained results which were at least encouraging. His impression, however, is that these same results would have been obtained had the ovarian extracts been omitted, and that the thyroid was the potent element in the treatment.

Aside from his personal experiences, he has been unable to find any reports in the literature which would convince him that this experience has been unique. Indeed, almost the only optimistic reports have been those embodied in the literature issued so generously by manufacturers of these preparations. The German school of gynecologists appears to have replaced ovarian therapy with pituitary therapy in cases of amenorrhea, as evidenced by such

recent contributions as those of Köhler, Hofstätter, Fries, Zöppritz, and others.

In spite of the poor results which ovarian therapy gives in cases of functional amenorrhea, it is certainly to be preferred to the less rational, equally unsatisfactory, and more dangerous use of the emmenagogue drugs which have in the past been so popular (the vegetable oils, manganese, etc.). In many instances amenorrhea, in itself, calls for no treatment whatsoever, although it is at times difficult to convince patients of this fact. The laity, and to a less extent the medical profession, still seem to look upon menstruation as a means of ridding the woman's body of noxious elements. Furthermore, not a few women believe that amenorrhea predisposes to tuberculosis—that if a girl does not menstruate regularly she is likely to go "into decline." For this reason an important part of the treatment of amenorrhea is to reassure the patient, to enlighten her as to the real significance of menstruation, and to impress her with the innocuousness of its absence, provided the amenorrhea is not secondary to some serious constitutional condition, such as tuberculosis or anemia.

As to the actual clinical results in cases of functional uterine bleeding, especially the hemorrhage of puberty and the climacteric, little of a definite nature can be said. Good results have been reported by a few writers, but these reports are so few, in comparison with the great number of unsuccessful cases, and therefore usually unreported cases, that they must be received very unenthusiastically. The form of therapy which has been perhaps most widely used for this purpose is the intramuscular or intravenous administration of the water-soluble extracts. In the light of what has been said above as to the questionable value of these aqueous extracts, considerable doubt is thrown upon the occasional reports of good results following their use in cases of uterine bleeding. Certainly uterine hemorrhage, in his own experience, is no less frequently benefited by the use of thyroid or pituitary extracts than by the use of either ovarian or corpus luteum substance.

In the presence of menopausal vasomotor symptoms the indication for the use of ovarian extracts of one form or another is good—*i. e.*, it is based on known facts. He believes it can be said that there is a nearer approach to unanimity among clinicians as to the value of ovarian therapy for this indication than for any other. Whether, in the treatment of these disorders, ovarian or corpus luteum extracts actually do "hit the spot," or whether we are here concerned with a great fog of self-delusion on the part of both patients and physicians, it is difficult to determine, through the very nature of the case. The hot flushes, the flashes of heat, and the other characteristic symptoms of the menopause are purely subjective symptoms. They vary much in severity in different women, and in the same woman at different times. The duration of the menopausal disturbance also varies a great deal, some women being annoyed for only a few months, others for a good many years. It is obvious, therefore, that the greatest caution is necessary in drawing conclusions as to the value of any therapeutic agent for symptoms of this character. Unless he has been greatly deceived, he has seen genuinely good results from organotherapy in this group of cases. The symptoms have often appeared to be diminished, though rarely do they cease entirely. These results have been obtained even when reviewed in the light of such clinical checks as are open to us in the management of cases of this type.

As to dysmenorrhea and genital hypoplasia (infantilism, etc.), the only type of dysmenorrhea in which there would seem to be any excuse for ovarian therapy is that associated with underdevelopment of the uterus. The latter condition is probably not a manifestation of primary hypofunction of the ovary. He does not agree with the assertion of Frank that the pituitary has nothing to do with the causation of uterine hypoplasia. There is considerable evidence, both clinical and experimental, that it is concerned. It would be absurd to argue that the existence of such a relation is made doubtful by the mere fact that

pituitary feeding does not give results in cases of underdevelopment of the generative organs—just as absurd as to claim that the ovaries have nothing to do with menstruation because ovarian extracts will not bring on menstruation in castrated women. The pituitary treatment, as a matter of fact, would seem to be a logical plan in cases of genital hypoplasia, with or without dysmenorrhea. Since there is also at least a secondary hypogenitalism in such cases, ovarian extracts would seem to meet a definite indication. The fact remains, however, that the actual clinical results by various combinations of these two organ extracts are negligible, so far as he has been able to learn. He does not believe, however, that the poor results from this method of treatment are to be considered as reflecting upon the correctness of the theory upon which it is based.

In 1916 Hirst suggested the hypodermic employment of the soluble preparation of corpus luteum in cases of vomiting of pregnancy. His view is that "it is not unreasonable to suppose that there is sufficient absorption from the corpus luteum of pregnancy to account for disappearance of nausea, especially when one realizes that the nausea begins to diminish at the time the corpus luteum has reached its acme of development." This explanation is obviously purely speculative. It is a good example of endocrinology of the less desirable sort. In spite of this fact the treatment based on this idea was gobbled up without question by a profession always hungry for something novel and at least pseudo-scientific. Although Hirst reports eighty per cent of cures in cases of vomiting of pregnancy from the corpus luteum solution, which he now advocates administering intravenously, these figures have not been borne out where the result has been properly checked, as in the recent report of King. Rongy and others have likewise reported disappointing results. Novak's own feeling is that the method will soon be thrown into the rapidly growing endocrinological junk heap.

The results of the treatment of sterility by ovarian corpus luteum extracts have not been sufficiently good to commend them to most clinicians. Even when an occasional successful result seems to follow, it need scarcely be said that the greatest caution should be exercised in crediting it to the organotherapeutic measures employed. Fallenberg has advocated large doses of the extracts, beginning with five grains a day and gradually increasing until at the end of a month thirty grains a day is being taken. The treatment, he believes, should be continued for one year.

The most successful cases, according to Solomons, are those in which menstruation is scanty. These are ordinary instances of uterine hypoplasia, in which the ovarian therapy is most frequently combined with the administration of pituitary substance. In spite of sporadic and usually unchecked reports of success, good results are not ordinarily to be looked for in the treatment of sterility by ovarian extracts.

Obesity is frequently observed in cases of hypogenitalism, especially at the menopause or after surgical removal of the ovaries. Here the indication for ovarian therapy would seem quite clear, but it is only fair to say that it rarely yields results unless combined with the administration of thyroid extract, in which case the latter is undoubtedly the potent agent.

In judging the results of ovarian therapy, or, for that matter, of other forms of organotherapy, most of us have unconsciously succumbed to the familiar "post hoc, propter hoc" error into which it is so easy to slip.

In connection with endocrinology, some one has given an amusing illustration of the absurdities into which we are so easily led. If the administration of cascara relieves constipation, ought we to assume, inquires this philosopher, that the constipated individual is a sufferer from hypocascarism? Ridiculous though this seems, it represents exactly the method of reasoning employed by many of us when we leave good old mother earth to float dizzily through the cloudbanks of endocrinology. As Cushing

said in his address last year, "The Lewis Carroll of to-day would have Alice nibble from a pituitary mushroom in her left hand and a lutein one in her right, and presto! she is any height desired."

The real stumbling-block to success in ovarian therapy, as will be gathered from what has already been said, is a much more material one than that just mentioned, having to do, so to speak, with a condition and not a theory. Nothing can be more certain than that removal of the ovaries brings about a cessation of the menstrual function and frequently the appearance of a characteristic grouping of symptoms. Equally certain does it seem to be that the symptoms of the normal menopause are due to the cessation of ovarian activity. It does not follow, however, that the feeding or the injection of ovarian extracts can replace the normal ovarian secretion, that it can restore the menstrual function and cause a cessation of the menopausal symptoms. The removal of the parathyroids, to select another example, produces tetany and death. The fatal result cannot, however, be averted by the feeding of any amount of parathyroid substance.

There are a number of perfectly rational indications for the employment of ovarian therapy in which the actual clinical results are of no especial value. In spite of the confession of unsatisfactory results embodied in this paper, he is frank in saying that he employs ovarian therapy for certain indications because he believes it to be based on rational principles, and because it is reasonable to hope that the biological chemist will sooner or later succeed in giving us ovarian extracts which will really approximate in their effects the action of the ovarian secretion *intra vitam*. This, after all, is the real crux of the situation as it now exists.

In conclusion, Novak frankly admits that the skeptical tone of this paper reflects an attitude deliberately chosen at the outset. If there is any field of medicine in which a healthy skepticism is urgently needed, it is that of endocrinology, and more particularly that of endocrine therapy. Hyperskepticism is more to be desired than hyposkepticism, to parallel the language of the endocrinologist. The medical profession is, on this subject, now swayed by a species of mob psychology which has deprived it of its common sense and its reasoning powers.

Incalculable harm has been done by the trashy superficiality, the ignorance, and at times the commercialism which are reflected in much of the enormous literature which has grown up, mushroom-like, within the past decade or so. Especially unfortunate has been the influence of several books published quite recently. The author of one of these sounds his theme in the preface of his book, when he states that "only by therapy and by the use of extracts of these glands can we be led to definite conclusions." Surely he lays himself open to the charge of plagiarizing from the detail man.

The Diagnosis and Treatment of Intracranial Hemorrhage in the New-born.

MUNRO and EUSTIS, in the *American Journal of Diseases of Children* for October, 1922, conclude that the following etiologic classification of cases of intracranial hemorrhage in the new-born should be adopted: (*a*) Traumatic group; (*b*) asphyxia group; (*c*) fetal disease group.

The diagnosis of intracranial hemorrhage in the new-born should be based on the following: (*a*) The history and physical examination. (*b*) The measurement of intracranial pressure by spinal manometer. (*c*) The determination of the coagulation and bleeding times.

The treatment of intracranial hemorrhage in the new-born depends on (*a*) the successful etiologic classification of the case; (*b*) the recognition and measurement of the intracranial pressure.

The treatment of intracranial hemorrhage, due to hemorrhagic disease, consists of the administration of normal whole blood subcutaneously until the bleeding and coagulation times have returned to normal,

and then appropriate relief of the intracranial hypertension.

The treatment of traumatic cases consists of the prompt elevation of depressed fractures, and the relief of the intracranial hypertension by drainage either by lumbar puncture or ventricular puncture as indicated, or typical subtemporal decompression.

The treatment of asphyxia cases consists of the relief of the intracranial hypertension by drainage either by lumbar puncture or ventricular puncture as indicated, or typical subtemporal decompression.

Cerebral localization of pathology in the new-born is rarely possible, and is, therefore, not amenable to surgical measures looking toward its correction.

The pathology, diagnosis and treatment of Little's disease should be studied more extensively from the point of view of intracranial pressure.

The Food Requirements of Children.

HOLT and FALES, in the *American Journal of Diseases of Children* for October, 1922, state that the conclusion to be drawn from all the observations and discussions presented in their series of articles is the emphasis to be placed on the importance of the balanced ration. They have shown that the protein need of the growing child is very important, and there seems to be fairly general unanimity as to the amount required. All evidence seems to indicate that when 15 per cent of the theoretical total caloric need is supplied by protein, the nutritive needs in protein are met. The amount of fat required is still a subject of debate, but it seems reasonable and desirable that the amount of fat given to the growing child should be equal to the amount of protein. Since fat has two and one-quarter times the caloric value of protein, equal amounts of fat and protein would supply calories in the proportion of 2.25:1. Therefore, when the protein furnishes 15 per cent of the total calories, an equal amount of fat would furnish about 35 per cent. The remaining caloric need—that is, 50 per cent of the total calories—would then be supplied by carbohydrate.

When this distribution is deviated from to any marked degree for a long period—that is, when what seems to be a proper balance of the diet is disturbed—various undesirable results may follow. If the protein is reduced much below 15 per cent of the caloric requirement, the nutritive need may not be met. If the fat given supplies much less than 35 per cent of the total calories it usually happens that the carbohydrate intake is excessive and disturbance of digestion may follow. If the fat given supplies too high a proportion of calories the fat tolerance of the child may be exceeded and digestive disturbance may result from the excess of fat. High fat with high protein forms a food combination likely to cause constipation. Low fat with high carbohydrate is apt to cause looseness of the bowels. A large carbohydrate intake means a reduction in the necessary protein and probably equally important fat.

On the whole, one may conclude both from theoretical considerations and from practical observation that a diet in which the fat supplies 35 per cent of the total calories, the protein 15 per cent, and the carbohydrate 50 per cent, is one which meets the nutritive needs of the child after infancy, which is well borne by the digestive system and may be considered a well-balanced ration.

Rabbit-hair Asthma in Children.

In the *American Journal of Diseases of Children* for October, 1922, RATNER states that rabbit hair as an etiologic factor in the production of asthma would at first hand appear to be of little practical significance, but as he has shown its distribution is very wide-spread, it should be placed second to horse hair as a causative agent in the keratin group of asthmas.

While he has not been successful thus far in desensitizing this group of cases the removal of the hair is easily accomplished, and avoiding the hair relieves the patients of all symptoms.

In attempts at desensitization attention is called to certain dangers inherent in this form of treatment, and adrenalin should always be kept on hand to cope with any exigency which might arise.

Dosage undoubtedly plays a great rôle in the actual production of attacks.

Human beings are capable of showing what might be called temporary desensitization.

Eczema, vomiting, angioneurotic edema, urticaria, conjunctivitis, may all occur as a direct result of contact with animal hair, besides the classical symptoms of asthma.

In spite of most careful investigation Ratner was unable in his cases to find any history or other evidence which might indicate hereditary acquisition, and since in all of his cases prolonged contact with the rabbit hair in early infancy preceded development of the attacks he is inclined to favor the view that the condition, in his cases at least, was an acquired one. This differs distinctly from the point of view of Cooke, Vander Veer, Longcope, and others.

He suggests that rabbit hair, and all fine dust-producing substances, be kept out of pillows, mattresses, clothing, toys, etc., that are used for infants and young children. Infants suffering from chronic coryza and recurrent bronchitis should be carefully studied from the standpoint of their being potential asthmatics.

The Diagnosis and Treatment of Amebic Colitis.

REED, in the *American Journal of the Medical Sciences* for October, 1922, states that the treatment of amebic colitis is discussed by him from the standpoint of personal experience only. This experience includes two years' work in central China with foreigners and native Chinese as well as the resources of private practice and the Stanford medical wards. No reference is made to the enormous literature, history, and experimentation on this subject. There is a wide divergence of opinion and practice in the treatment of amebiasis, and the surprisingly large number of patients relapsing after various common methods of treatment is the best commentary on their ineffectiveness. He states it can be anticipated that some 90 per cent of chronic cases can be cured along the lines he advocates. Further courses of treatment will reduce the remainder. A residuum will be left as incurable by any method of treatment, and such cases will usually be found to harbor deep-seated infection in the appendix or other remote focus.

In the presence of acute clinical dysentery due to Entameba histolytica the stools show abundant vegetative forms and few if any cysts. Emetine hydrochloride should be administered, 1 grain in one dose hypodermically daily, for six to eight days. Improvement is usually seen at once and clinical cure seldom requires more than three to five days. From the etiologic and symptomatic standpoint no concomitant treatment is required. But thoroughness of treatment is perhaps enhanced and mixed infections better controlled if the patient is kept warm and absolutely quiet in bed on a restricted smooth diet. After an interval of two to four days the emetine should be repeated in similar dosage for five days. Following this second course the physician is guided by the results of stool examination, and further treatment, if needed, is substantially as detailed below for chronic cases, omitting the first week. Intravenous use of emetine is seldom necessary and is indicated only in fulminating cases.

In the subacute, chronic and carrier stages motile amebæ become progressively fewer and cysts alone are usually found. In the chronic cyst-bearing amebiasis a course of ipecac in massive doses is sometimes first employed. After a day of absolute rest on regular diet a single dose of 90 grains of powdered ipecac root is administered in 5-grain salol-coated pills. Opium in some form is given a half-hour previously. If possible this dose is increased to a maximum of 120 grains. In no case is this course prolonged beyond five days. Severe diarrhea is frequent and vomiting may appear at any time. It is a

matter of judgment how far to modify the treatment in the presence of these or other complications.

After the ipecac course two days of rest on regular diet are allowed. The second week is inaugurated by 0.3 gramme neosalvarsan intravenously. Each day, beginning with the neosalvarsan, a total of 3 grains of bismuth emetine iodide is given by mouth in one-grain pills. Each evening of this week a colonic irrigation is given with the patient in the knee-chest position. As near as possible to one gallon of 1-to-2000 thymol solution at body temperature is slowly introduced through a soft short colon tube.

The emetine iodide and colon irrigations are continued for six days, and on the seventh the patient rests. On the first day of the third week 0.9 gramme neosalvarsan is given intravenously, and the emetine bismuth iodide is continued as before for six days. The daily colon irrigation is continued each evening, using 1 to 2000 quinine solution. A third neosalvarsan dose completes the third week. The value of the colonic irrigations is sometimes debated, but the thoroughness of the treatment is doubtless enhanced by their inclusion. In place of the bismuth emetine iodide emetine hydrochloride may be employed hypodermically.

After the third week ordinarily treatment is contingent on the recurrence of cysts in the stools, in which case the procedure of the third week should be repeated. Stool examinations should be made at least twice weekly for a month, including both liquid and formed specimens, weekly for a second month, and monthly for two additional months before the case is pronounced clinically cured. At the present time it is doubtful if we can state with certainty when amebic colitis is permanently cured. Lacking ipecac treatment in some form the parasites probably remain permanently in man when once established. While there is a possibility of amebic parasitism being self-limited, as in the case of hookworm, this point is still uncertain.

The title of this paper does not include discussion of complications of amebic colitis. However, mention must be made of amebic foci in the appendix which are probably responsible for many resistant cases. Many of these, uncured by other treatment, will be cleared by appendicostomy and colon irrigation. But the same result apparently follows appendectomy and surgical removal in this way of the amebic focus. Appendectomy, therefore, should be considered in cases resistant to medical treatment. Biliary tract infection is a possibility worthy of serious consideration.

Obviously prevention of amebic infection depends primarily on proper disposal of cyst-infected fecal material. Secondarily and more practically it depends on avoidance of ingestion of cyst-infected food and drink. Food infection is favored chiefly by flies and by unclean methods of handling and preparation. Every individual should make it a practice to wash his hands immediately before eating and to keep his fingers out of his mouth at all times. In a broader sense, too, the possibility of the introduction of pathogenic amebæ by foreign immigration deserves special concern.

Emetine is a potent and toxic alkaloid and must be handled circumspectly. It causes gastrointestinal irritation, low blood-pressure with a fast, weak heart, and depression of the central nervous system. Its toxicity varies with different commercial preparations. The diarrhea produced by emetine may be confused with an uncured dysentery, and serious poisoning result, from pushing the drug too far. Occasionally cases of idiosyncrasy to emetine are seen. It causes considerable local irritation on injection.

The Treatment of Syphilis Among the Insane.

In the *American Journal of the Medical Sciences* for October, 1922, CHRISTIAN states that from his experience most cases of latent syphilis are not cured; but arrest in the development of the disease and comfort to the patient occur in a number of cases. The cases which show signs of im-

provement from a serologic standpoint can only be determined by treating and examining the blood.

The results obtained from treating the syphilitic insane have more than compensated for the time and expense, and it is his plan to continue treatments.

It is a matter of individual opinion whether cases of general paralysis confined in institutions for the insane should or should not be treated. He has obtained no results in such cases.

Every case in or out of an institution should have a spinal fluid examination if the blood is positive.

Among 1500 cases examined for syphilis, 12.5 per cent showed positive Wassermanns, and from this number of positive cases 26.2 per cent showed signs of neurosyphilis: 17.6 per cent being cases of general paralysis, and 8.6 per cent other forms of neurosyphilis. It is to be remembered that the above examinations show the results from latent syphilis, as no case recorded in the above shows clinical signs of syphilis excepting the cases of paresis, and they of course belong in the tertiary stage as neurosyphilis.

In conclusion, he emphasizes the tremendous importance of the early discovery and proper treatment of syphilis and the examination of spinal fluid, thus lessening the number of cases of incurable latent syphilis and neurosyphilitics.

The So-called Habituation to "Arsenic": Variation in the Toxicity of Arsenous Oxide.

The importance of arsenic as a poison and the interest taken in the so-called arsenic eaters of Styria makes the following report worthy of notice:

SCHWARTZE, in the *Journal of Pharmacology and Experimental Therapeutics* for October, 1922, states that experiments upon rats, rabbits and chickens have shown that the toxicity of different preparations of arsenous oxide administered undissolved per os varies markedly owing to the coarseness or fineness of their subdivision. The finer the particles of a preparation, the more potent it is, and *vice versa*. For the mammals used (rats and rabbits), the preparations consisting of the larger particles, when given in suitable amounts, produce death more slowly than those consisting of smaller ones. Preparations consisting of large particles are relatively more toxic for chickens than for these mammals. Experiments upon cats have shown that potency of arsenous oxide (administered undissolved) to cause emesis also depends upon the state of subdivision of the preparation of arsenous oxide used.

No generally valid statement as to the size of the exact lethal dose of undissolved arsenous oxide when administered orally can yet be given. The toxicity of each preparation must be determined experimentally, although it may be possible to estimate it approximately by determining the fineness of the "arsenic" with a low-power microscope. It is unsafe to judge this point by the naked eye because a preparation which appears fine to the naked eye may consist of particles so large as to possess relatively slight potency. In the light of the facts presented in this paper, therefore, the mere consumption with impunity of large doses of undissolved arsenous oxide is not proof that habituation exists. The toleration of such large doses may be due not to any attribute inherent in the consumer (*i. e.*, an immunity), but to an attribute inherent in the preparation of arsenous oxide consumed, namely, its relatively slow solubility, which has been further decreased due to its coarse state of subdivision. In order to establish in a given case without chemical data the fact that habituation (fictitious or real) has developed, it is therefore necessary to proceed in the following way: Determine the oral lethal dose of the particular (identical) preparation of arsenous oxide used and report the precautions taken in determining the same, and then demonstrate that the animal supposed to have been habituated is able to tolerate either more than this dose or more than the lethal dose of dissolved arsenous

oxide. If this can be demonstrated, the conclusion that habituation (fictitious or real) has developed would be justified.

In none of the reports of experiments with undissolved arsenous oxide which state that habituation occurs, have the requirements just outlined been fulfilled. They can all be explained as reasonably by assuming that preparations of arsenous oxide of variable and relatively low toxicity were employed as by assuming that habituation had occurred. This is the more probable as no investigator has yet been able to demonstrate conclusively the development of any certain degree of habituation to dissolved arsenous oxide. It is the contention of the writer, however, only that habituation of higher animals has not been proved, and not that it cannot exist. In the absence of positive proof, however, and in the face of certain negative results obtained by others, it can be said that the doctrine of habituation to "arsenic" is open to very serious question.

Surgical and Genito-Urinary Therapeutics

Autogenous Versus Heterogenous Bone Pegs.

TARNOWSKY *(Surgery, Gynecology and Obstetrics,* September, 1922) quotes Gask, of London, to the effect that those bone cells which are within reach of direct nourishment from the tissue in or on which they lie may live; the main mass of the graft dies. By the end of the third week (after implanting a so-called living graft) new channels appear in the necrotic graft, penetrating from its periphery, carrying vascular loops and giant cells which continue to absorb the old bone. New bone cells also form on the surface of the graft. Eventually the whole of the graft is absorbed and replaced by new bone produced by the activities of the surviving cells. Bone grafts in contact with living bones are attacked by the cells of the living bones, invaded, and replaced. The only advantage of a living bone graft is that some of the peripheral bone cells, in contact with free blood, will continue to live and thus assist in the bridging over the gap.

Tarnowsky's deductions are based on seventeen cases of beef-bone pegging and the use of ivory screws or nails in approximately fifty cases. His conclusions are as follows: The clinical behavior of a beef-bone graft depends entirely on the relative activities of the osteoblasts and osteoclasts:

With proliferation of new cells from the living proximal and distal ends of the fractured bone keeping pace with absorption of dead cells from the graft, complete disappearance of the latter coincides with complete union of the fracture or filling in of the defect.

With hyperactive new cell formation and sluggish absorption, the graft constitutes a sequestrum which either eburnates and remains in a state of quiescence or acts as an irritant foreign body with sinus formation and periodic extrusion of dead bone spicules.

With hyperactive bone absorption and sluggish new-bone formation the graft disappears by combined extrusion and absorption before union or filling in of the defect has taken place.

The factors which enable us to attain the ideal—*i. e.*, an even balance of absorption and proliferation—are: first, the thorough trimming off of dead bone proximally and distally with curette and chisel; second, firm approximation of the bone graft to living bone; and third, absolute asepsis.

Finally, it has seemed that the term infection, as applied to bone surgery, is too loosely used, and that in many cases of so-called septic results we are merely dealing with type three—*i. e.*, rapid necrosis of the graft without infection, using the latter

term in its proper sense. In other words, subacute osteomyelitis, with no antibody reaction on the part of the individual, should not be classed as an infection but as ordinary tissue necrosis.

Post-transfusion Reactions.

LEVINE and SEGALL *(Surgery, Gynecology and Obstetrics,* September, 1922) report that after a long operation in which ether is used as an anesthetic the patient's serum is altered as regards its isohemoagglutinin properties. This change lasts for about twenty-four hours, from which it follows that no transfusion should be done during or within twenty-four hours following ether anesthesia, even when the donor has been found suitable previous to the beginning of ether anesthesia.

Kaliski and Freedman are quoted to the effect that multiple transfusions from a given donor to a given recipient cause the development of specific agglutinins and hemolysins against the donor's cells which were originally not present.

Ottenberg and Libman, in 1915, were the first who from clinical observations pointed out the danger of post-transfusion reaction following the second, or subsequent, transfusions from a given donor to a given recipient, even when the test previous to the first transfusion proved the blood to be compatible, and. moreover, even when no reaction followed the first transfusion. Two years later the same authors emphasized "the necessity of doing tests again if transfusion is repeated even if the same donor is used." They reported that they had "seen several instances in which a patient developed new agglutinative and hemolytic powers toward the blood cells of a donor to whom he had not originally been agglutinative or hemolytic. In one of these cases, a young man, suffering from hemophilia, a first transfusion of 50 cubic centimeters by the syringe method was followed by no reaction whatever, and the tests showed absence of hemolysis or agglutination. A month later, an identically similar transfusion of the same amount of blood was followed by an immediate reaction, consisting of partial collapse, nausea and vomiting, generalized urticaria, violent headache, and hematuria. Blood obtained from patient and donor a few days after this occurrence showed that the serum of the patient was now strongly agglutinative to the cells of the donor. It was not determined whether the agglutinin present was due to the patient having changed his group (a hitherto undescribed occurrence), or to the development of a new immune isoagglutinin."

It must be borne in mind that not every transfusion in which a given donor is used two or more times for a given recipient is necessarily accompanied by a reaction. Butsch and Ashby report 26 cases in which the same donor was used twice for the same recipient, in 16 of which no reaction followed either transfusion, while in 7 only one transfusion was accompanied by reaction, and in the remaining 3 a reaction followed both transfusions. Meleney, Stearns, Fortuine and Ferry, however, in a review of 280 transfusions, concluded that subsequent donation of blood by a given donor to a given recipient tends to increase the frequency of reaction in direct proportion to the number of transfusions.

The latter authors, from a study of the same series of 280 transfusions, pointed out the interesting fact that repeated transfusions from several donors to a given recipient also tend to increase the frequency of reaction in this recipient.

McLure and Dunn, in an excellent analysis of 150 transfusions, found that "in the patients for whom many transfusions have had to be done it became more and more difficult to find donors whose blood would match that of the patient. A donor may match perfectly early in the series of transfusions and later be found unsuitable. . . . It is, therefore, most important that the bloods be matched before each transfusion."

All these observations together point to the definite phenomenon which must now be accepted as an incontestable fact, namely, that the original isohemoagglutinin and isohemolysin properties of the recipient's

blood are altered as the result of the addition of donor's blood.

There is a very close resemblance between the symptoms and signs of a reaction following a second transfusion from the same donor and the symptoms and signs of anaphylactic shock.

Treatment of Chronic Urinary Retention by Tunneling the Prostate.

VILLEMIN *(Urologic and Cutaneous Review,* September, 1922) notes that prostatectomy is performed for the relief of one condition—that is, urinary obstruction. That this operation is always a grave one and has a definite mortality, for which reason Luys has proposed and practiced a method of tunneling the prostate accomplished by an electrocoagulation of the obstructing masses through the natural passages and under the control of the eye, without anesthesia, by means of the powerful diathermic apparatus of d'Arsonval-Gaiffe. He makes a groove, levels the inequalities of the prostatic lobes, boring a tunnel, a trench in the median lobe, bringing to the same level both the posterior urethra and the base of the bladder.

In Luys's hands this operation shows only the small mortality of 1.25 per cent. In 90 per cent of the cases the patients who had difficulty with micturition, or who could not urinate at all, recovered the power of urination; chronic retentions of many years' duration disappeared after a few treatments with forage. With 500 cc and more of residual urine beforehand, the patients so treated had only a few cubic centimeters afterward.

The remote results are just as satisfactory as the immediate. Prostatics one year, two years, after tunneling urinate as freely as on the first day. In his publication Luys states that prostatectomy should be reserved for very large prostates only, which would necessitate the use of too large a number of tunnelings to obtain the results which are sought, and his operation should be the therapeutic measure of choice in all other cases of prostatic hypertrophy; exceptions being made in prostates suspected of having undergone malignant degeneration.

To substitute for a bloody operation which is always grave a therapeutic procedure devoid of danger through the endourethral route, the results of which are just as good, is to break open an important halting place in progress, to give a rude if not a fatal blow to suprapubic prostatectomy which seems till now to have attracted the support of all urologists.

Influenced by these considerations Villemin states that for the last year he has employed Luys's method in every case in which the indications seemed present. He has but a small number, to-wit, five; four were successful, one proved a failure. The method seems indicated in cases of obstruction incident to small prostates, with subcervical bars, with juxta-cervical sclerosis, submucous adenomata, etc.

Rubber Envelope Pads for Gauze in Abdominal Section.

BISSELL *(Surgery, Gynecology and Obstetrics,* September, 1922) takes as the main subject of his contribution the lessened trauma incident to using towels enveloped in rubber in place of the ordinary intra-abdominal pads, and also records the effect of ether, morphine and rectal therapy upon postoperative vomiting. Considering the question of ether in its relation to vomiting, his analysis of cases shows, first, that the average time of etherization, in the cases which did not vomit at any time, was three minutes shorter than that in the cases which did vomit during the day.

Second, that the average time in the 13 cases under ether between 30 and 55 minutes, which did not vomit, was two minutes longer than that in the 38 cases under ether the same length of time but which did vomit during the first day.

Third, that the average time of the remaining 17 cases etherized less than the 30 minutes, which did not vomit, was only one minute less than that of the 30 cases etherized the same length of time but which did vomit during the first day.

Of the two cases which vomited irregularly with regard to days, one vomited on each of the three days and was etherized 30 minutes. The other vomited on the second day only and was etherized 15 minutes. Accidental causes were determined immediately preceding the emesis which occurred in these cases on the second and third days. The first case might, therefore, be classified with division 2, and the second case with division 1; but as these cases constitute so small a part of the entire group, and as the length of their respective etherization could alter but little the percentage of the divisions, they might be disregarded entirely.

It would, therefore, seem that regarding the relationship between the duration of etherization and frequency or infrequency of emesis, there is no fixed rule.

Bearing on the influence of rectal therapy on postoperative emesis the author concludes that it is without value. When administered immediately before the termination of the operation, or given by the drop method in the form of saline, bicarbonate of soda, and glucose, it seems equally futile in so far as the vomiting is concerned. The author concludes as follows:

In 300 successive non-laparotomized cases, etherized, over 26 per cent escaped vomiting altogether; nearly 70 per cent vomited only in the first 24 hours, and 4 per cent vomited irregularly.

The length of etherization has no relationship to postoperative emesis with respect to frequency or days of occurrence.

The influence of morphine administered hypodermically after operation is, with respect to emesis, practically *nil.*

The dominating fact in the causation of emesis when the peritoneum of the intestines is not traumatized is ether, and the limit of its influence is 24 hours.

In 400 successive laparotomized patients, the use of rubber envelope pads resulted in freedom from vomiting in practically the same proportion as in the non-laparotomized patients.

Comparing nearly equal numbers of laparotomized cases under approximately the same conditions, this study demonstrates that to substitute the rubber envelope pads for gauze pads is to double the chance of escaping vomiting; to reduce two days' vomiting by one-third; to cut three days' vomiting 60 per cent; and to lessen distention by two-thirds.

The dominant factors in the causation of emesis in laparotomized cases are ether and trauma of the peritoneum of the intestines, and while the influence of ether is only 24 hours, the influence of intestinal peritoneal trauma may extend to three days or more.

Less vomiting, less distention and less morphine shows less trauma to the peritoneum.

The rubber envelope pads consist of two parts, an envelope and a pad. The envelope is made of thin rubber tissue and the pad is made of toweling material sewed together in such a manner as to give firmness and resistance. A loop of narrow tape 10 inches or more in length is sewed to the upper border of the cloth pad. When the cloth pad is placed in the envelope the loop of tape is passed through reënforced holes located on the upper margins of the rubber envelope. By this means the envelope is closed and the pad prevented from escaping. An iron ring is attached to the free end of the loop of tape for the purpose of indicating the presence of a pad in the cavity. Three pads, two large and one small, constitute a set; the larger are 8 by 8 inches and the smaller 8 by 4 inches.

The rubber envelope pads are used intra-abdominally in the place of gauze pads. Whether the patient is placed in Trendelenburg's position or not, the intestines should be pushed above the iliopectineal line before introducing the pads; the abdominal wall is then lifted with a retractor, and one of the large pads folded lengthwise is placed in the region of the cecum; the other is placed in the region of the sigmoid; and the smaller pad is placed perpendicularly in the middle of the true pelvis. The small pad is again used when the peritoneal layer of the wound is being sutured to keep the intestines from the field of work. It can be removed

through a very small opening without traumatizing the peritoneum in the region of the wound.

Gauze pads should never be used in the envelopes as substitutes for towel pads as they do not furnish the required firmness and resistance to keep the intestines away from the field of operation.

The Etiology of Postoperative Pulmonary Complications.

CUTLER *(Surgical Clinics of North America,* Vol. 2, No. 4, 1922) after alluding to the controversy which for years has been carried on as to the cause of postoperative pulmonary complications, calls attention to a chart which he publishes with a fluctuation of mortality figures due to a failure in 1919 to eradicate certain cases of old people dying from infection, in some of whom the pneumonia was merely a terminal manifestation, and to a disastrously large number of fatal embolism cases in 1921. The five cases of the latter sequela in 1921 brings the percentage to 0.31 per cent, as compared to Wilson's figures of 0.12 per cent for 40,449 operations at the Mayo clinic.

The anesthesia figures show practically the same morbidity after gas-oxygen as ether. The low figure for local anesthesia is not comparable, since it is obvious that local anesthesia is rarely employed in septic cases or in abdominal operations, which are among the chief predisposing factors to such complications. The lesson which one can draw from the local anesthesia figures is that complications do occur under even the most favorable conditions.

By early investigations there has been a linking together of anesthesia with these conditions, and even to-day some hold that aspiration is the chief cause of postoperative pneumonia. This has resulted in the unjust term "ether pneumonia." It has been shown experimentally by Hoelscher that under ether coloring-matter in the mouth is aspirated to the lung, and by Kelly that coloring-matter placed in the stomachs of anesthetized animals reached the lung when vomiting was induced by apomorphine. Moreover, the dye traveled to the side upon which the animal lay, emphasizing simple aspiration. It has also been shown that sputum spray probably reduces the local resistance to infection. And Whipple has shown that Group IV pneumococcus, known to be carried in a high percentage of normal mouths, is usually present in the pneumonias following operation.

This, however, by no means proves that the aspiration from the oral cavity causes pneumonia or other pulmonary disease. As a matter of fact, we should expect such sequelæ to arise following almost every operation since the above conditions are commonly present. That they are relatively infrequent upsets the theory of aspiration as the chief cause of such complications.

Embolism and infarction have been proposed as the cause of certain postoperative pulmonary sequelæ since fatal pulmonary embolism was first recognized. With the advent of local anesthesia and the observation of these and other pulmonary complications following its use in operations, this factor was further proposed as the means of their production. We find Gerulanos in 1900 using this mechanism to explain the complications in certain of his cases, and a few years previously Mikulicz and Kausch had proposed infarction and embolism as a probable cause in many of these postoperative conditions. Since then there have been many brilliant papers defending the embolic theory of the etiology of these sequelæ.

The frequency of such sequelæ after abdominal operation has long been recognized.

In such cases two sources of embolism and infarction are possible: the blood-vessels of the parietes, and the lymphatic avenues. Moreover, the lesion may occur immediately following the operation, and patients on recovery may complain of severe pain on respiration, may cough up blood-tinged sputum, and may show a focal area of consolidation demonstrable by the *x*-ray. The immediate medium for setting free the emboli lies either in manipulations

at operation, especially the rough use of retractors, or in the movements of respiration.

The clinical picture induced by infarction is variable and may simulate pleurisy, pneumonia, or, on occasions, bronchitis. Pain is usually the first symptom, its appearance being due to the exudate that results at the periphery of the lesion. Pain, therefore, may not represent the original lodgment of the embolus, but the secondary changes. If the infarct involves a lobule in the center of the lung, pain may be entirely lacking and the diagnosis, therefore, more difficult to determine. The *x*-ray is the most informing method in the diagnosis of these conditions. But such studies must be made early, since the changes are often temporary variations in blood-vessel size and pressure which soon readjust themselves.

It is thus seen that embolism and infarction can account for fatal pulmonary embolism, bronchopneumonia, pleurisy, and lung abscess. That lobar pneumonia occurs as a true complication is probably true; however, it is very rare, and in those cases observed there has usually been some special factor in addition, as, for example, a story of marked susceptibility with three or four attacks of pneumonia in the past.

The cases of bronchitis fall into a separate group. It seems as if most of them were constituted of cases in which there was good evidence of a previously existing lung disorder. This may be a chronic bronchiectasis, an incipient or unrecognized tuberculous lesion, or even a chronic emphysema. It has been shown that by the use of routine preoperative and postoperative *x*-ray studies, as well as careful clinical examination, not all such preëxisting disease lights up under the stimulation of operation. It is true that such lesions are more easily stirred up by inhalation anesthesia, and it is in this relatively small and benign group that the advocates of the irritation-aspiration theory have their chief support.

The majority of pulmonary complications are due to embolism from the field of operation. The result is either fatal pulmonary embolism or pulmonary infarction. The latter manifests itself, typically, by its rapid onset, pain, expectoration and temperature, and the signs of a focal consolidation, overlain by a friction-rub. These patches are demonstrable by the *x*-ray provided such studies are made at once. The condition is often mistaken for pleurisy or a transient bronchopneumonia. In cases in which a previously existent lung pathology can be deduced, bronchitis or pneumonia may ensue, and in some of these cases the direct cause may be the irritation of the inhalation anesthesia plus the aspiration of mouth contents. However, it has been shown that in such cases activity sometimes follows when local anesthesia is used.

Anesthesia and anesthetists should not bear the blame, therefore, for these complications, which are usually due to trauma, sepsis, the mobility of the part, and the resultant embolism.

Treatment of Fractures of the Hip by the Whitman Abduction Method.

Further testimony as to the efficiency of this method is offered by Powers *(Wisconsin Medical Journal,* August, 1922), who holds, on the basis of an experience with 22 cases, giving over 90 per cent of good results, that this method fills the requirements of the treatment of fractured hips of all types and of all ages, and that no other treatment meets these requirements. He believes that the Whitman abduction treatment should be adopted as the standard treatment for fractured hips. He states that in approaching a fractured hip we have the following conditions to deal with: after the fracture has occurred the long or outer fragment is pulled up by the glutei and is externally rotated by the gluteus maximus, pyriformis, obturator internus, and gemelli. The fractured surface of the inner or short fragment faces forward and downward, due to the relaxed capsule and to pressure above it from the outer fragment of the fractured neck.

The manipulations necessary for reduction by the Whitman method are as follows, with the patient on a fracture table: First, flexion of the injured hip to free any fold of capsule that may be caught between the fragments. The uninjured leg is then measured, and the injured leg is drawn down to this length, while the operator lifts the trochanter to the normal plane. The uninjured leg is then abducted to the full limit, for the purpose of fixing the pelvis and of establishing the normal range of abduction. The injured leg is then internally rotated to bring the two fractured surfaces of the fragments together, and for the further purpose of tightening the external rotaters and posterior part of capsule in such manner as to form a firm support against angulation backward of the fragments. The injured leg is then abducted to its full normal range. This brings the great trochanter against the pelvis, relaxing the gluteal muscles, which, if in contraction, favor deformity, and holding the outer fragment against upward displacement. Abduction renders the entire capsule tense, bringing the fragments in firm contact, and reëstablishes the proper angle between neck and shaft. A long plaster spica is then applied from toes to the axilla, to hold the leg in this position. This is allowed to remain for three months, the knee being liberated in six or eight weeks. Impacted fractures are usually incomplete fractures and should be changed to complete by forcing the abduction and pressing down on the trochanter. If this is not done shortening will occur, due to the loss of the normal angle between neck and shaft.

Mobilization of Joints with Bony Ankylosis.

CAMPBELL (*Minnesota Medicine*, September, 1922) states there are only two conditions that cause ankylosis in which open surgical procedures should be employed for the purpose of restoring motion: (1) traumatism—crushing of the joint surfaces, tearing of the periosteum, or multiple fractures, followed by bony ankylosis; (2) acute infectious arthritis due to staphylococcus, streptococcus, pneumococcus, gonococcus, etc. These organisms erode and disintegrate the cartilages and the superficial bone, unless the infection begins in the shaft, and then we have an extensive osteomyelitis and not a localized arthritis.

It is hardly necessary to state that sufficient time should elapse after all acute symptoms have subsided. Children are not suitable subjects as a rule. The prognosis is better between the ages of twenty and thirty, though his oldest case was fifty years of age.

All operators usually reproduce, as far as possible, the normal joint; but there seems to be a difference of opinion as to the material to be interposed between the bony surfaces. There are six methods in common use, as practiced by various surgeons:

Wide excision of articular surfaces, which usually causes instability and should not be considered.

Pedunculated fascial flaps have been extensively employed between the articular surfaces, after remodeling or carving out a new joint.

Interposition of animal membranes, specially prepared, as Cargile's, Baer's pig bladder, Allison's fascia, etc. While success has been reported, the disadvantage is that foreign body irritation invites infection and the material is often extruded.

Transplantation of free fascia between the joint surfaces.

Transplantation of free fat between the joint surfaces.

Mechanical reconstruction of the articular surfaces with removal of sufficient bone to secure mobility without the interposition of any substance.

The technique of arthroplasty or neoarthrosis differs as do the mechanics of various joints. A reproduction of the joint in detail is not essential; in fact, unnecessarily complicates the procedure. A joint should, however, be constructed to meet the requirements of the normal, and have the

same action. To make an intercondylar notch at the knee is of no value except from a cosmetic radiographic standpoint, as no crucial ligaments or semilunar cartilages are forthcoming. We construct one large condyle on the lower extremity of the femur and a shallow cavity on the upper extremity of the tibia.

In the hip-joint a new head and acetabulum are made. Sufficient femoral neck must be present if a ball and socket joint is reproduced. A pedunculated fascial flap is easily obtained and has given the best results.

In the jaw, Henderson has demonstrated that normal function may be obtained by wide excision without the interposition of any membrane or tissues.

The elbow lends itself well to mobilizing operations. Function may be obtained by wide excision, but such joints are weak and unstable. An external lateral incision is advised, exposing the triceps muscle with its broad aponeurosis, which is dissected out, making a long tongue of dense fascia, the fibers of the muscle being incised in the midline to the humerus over the lower third, after which the entire mass is separated from the bone. This gives free access to the joint, which is remodeled, making a convex surface on the lower extremity of the humerus. The surface of the sigmoid cavity and radius is denuded. The muscle fibers of the triceps, with fascia and periosteum, are stitched to the anterior capsule, making a viable flap between the articular surfaces. If for any reason this flap cannot be employed, the tendinous aponeurotic tongue, above described, is placed between the surfaces. No attempt is made to mobilize the radio-ulnar articulation.

In the shoulder-joint there is rarely a complete destruction of the articular cartilage on the head of the humerus, or through the glenoid cavity, a factor which should be utilized. After incision into the joint all scar tissue is excised, and in some cases the entire capsule. The relations of the joint surfaces are changed by moving the head of the humerus so that normal cartilage will articulate with the glenoid fossa. A fascial flap can be easily interposed if necessary.

In other joints similar principles, as in the hip, knee, elbow, and shoulder, have been applied.

The amount of bone to be removed is variable in different joints and also in the same joint in different individuals. In those with lax joints and weak musculature less bone should be excised. Fascial and capsular contractures must also be taken into consideration. When possible, much can be accomplished by conserving articular cartilage, recesses of normal healthy synovial membrane, and other structures.

The after-treatment is begun as soon as there is healing of the wound. This requires the constant surveillance of the surgeon with the aid of an efficient physiotherapeutist. Active motion is encouraged, and passive movements daily increased. An intelligent coöperation on the part of the patient is essential, for unless voluntary motion is secured within thirty days there is little chance of success. In lower extremities weight-bearing is allowed as soon as tenderness has subsided, which materially aids in restoring function.

Sulfarsenol in the Treatment of Syphilis.

HEWINS and ACRE *(Urologic and Cutaneous Review,* September, 1922) state that sulfarsenol is a pale yellow, finely divided powder, smelling like sulphur. It dissolves readily in water, making a very stable solution. It has been given in quantities of 12 grammes in a month without signs of intolerance. The dose as given has been 0.6 gramme in 1 cc of distilled water into the buttock every six or seven days. There was some pain caused by the injections; this is the experience of Yernau and Bernard. There were no local reactions. The healing of the primary sore seems to have been slow. They believe sulfarsenol to be equal to, if not better than, neoarsenobenzol.

The authors selected ten patients, repre-

senting a variety of manifestations of syphilis in all stages; the size of the doses ranged from 6 to 60 ctgms. Each patient received ten doses.

The following was the technique employed: The neck of ampoule is filled evenly half-way up the neck; from 10 to 30 minims of sterile distilled water is injected into the ampoule with a hypodermic syringe, and the solution is gently agitated until the drug is completely dissolved, which only takes a few seconds. The solution is then drawn up into the syringe and injected through a hypodermic needle into the loose skin of the upper arm, or in the subscapular region. It also may be given, as the authors did in some instances, into the vein of the forearm or into the muscle of the buttock.

The interval between administrations ranged from every day in some cases to every sixth or seventh day in others.

The majority of the injections were given subcutaneously, some intravenously, and a few intramuscularly.

The upper arm, subscapular region and loose skin of the lower abdomen were the sites selected for the subcutaneous administration; the intramuscular injections were given in the buttocks; the subcutaneous injection of sulfarsenol, in their series, caused no more pain than would the same amount of distilled water or normal salt solution at the time of injection. There was always some swelling, redness and induration for about forty-eight hours, with tenderness but no pain. In no instance was the patient incapacitated from doing his or her daily work, and one patient (a blacksmith) used a heavy hammer without any undue inconvenience, after repeated daily injections in his arm.

In only one instance was there any immediate or late reaction, and this occurred in a woman of a very neurotic temperament. About ten minutes after the subcutaneous administration of the fifth dose this woman showed a slight nitritoid crisis which lasted about twenty minutes. She received five doses following this one without the slightest reaction.

In the chancre stage the serum of the lesion was examined daily under the dark ground, and in no case was the spirochete found after forty-eight hours following the first injection of sulfarsenol subcutaneously. The majority of the mucous patches and secondary manifestations of the skin disappeared after the third injection, and one case of interstitial keratitis rapidly began to heal after the second administration, being almost gone by the sixth.

The Wassermann was favorably affected in all but two of the cases, being rendered negative in six instances, lowered in two, and unchanged in two; however, in the last two all other symptoms rapidly disappeared.

Notes of these ten cases are appended. They conclude that sulfarsenol seems to equal other forms of arsphenamines and neoarsphenamines, except that it causes the spirocheta pallida to disappear less slowly when given subcutaneously; this might hold true of the other forms could they be given subcutaneously.

The subcutaneous method is fool-proof and practically painless.

It is ideal for the treatment of those whose veins are very difficult or for infants.

The usual contraindications for "606" and "914" do not seem to prohibit the use of sulfarsenol at all.

Definite conclusions cannot be drawn as to the lasting effect of sulfarsenol, from this short series; however, it does influence the blood Wassermann.

Progress in Cancer Research.

LUDEN *(Minnesota Medicine,* September, 1922), in a scholarly article on this subject, dealing with the history of the study of this disease and giving many interesting details, concludes his article as follows:

The history of cancer research shows that the formerly much derided biochemical conception of malignant growth has not only survived through twenty-four centuries, but that it is gaining ground to-day because instruments and methods for chemical investigations are available.

The practical value of researches along chemical lines in malignancy has been demonstrated by recent investigations.

The complexity of metabolic functions and the number of organs concerned in their regulation make it seem improbable that any single cause of or cure for malignancy is likely to be discovered.

The very multiplicity of the factors underlying malignant growth warrants, however, the conclusion that the consideration of all factors which tend to disturb metabolic processes in the body, that is, chemical processes, will prove of benefit to the victim of malignant disease.

The complete and spontaneous regression of inoperable, malignant tumors in 100 well-authenticated cases is conclusive evidence that the human body can wage a winning fight against malignancy.

The knowledge that other patients have become clinically well, although the odds seemed entirely against them, can do no harm to any patient suffering from a malignant condition and may prove beneficial to him.

Early diagnosis and early treatment of malignancy are of primary importance, but the regulation of the diet is of value, also, because it facilitates the chemical tasks of the body.

Prophylaxis of Neurasthenia in Convalescents.

HULBERT *(Illinois Medical Journal,* September, 1922) thus writes on this interesting but much neglected topic:

When it is realized that the vicious spiral of the etiology of neurasthenia is that the patient (*a*) has too much time to think; (*b*) is unaccustomed to disciplined thinking; (*c*) thinks too much about herself, her body, her illness; (*d*) has increased fatigue; (*e*) shows alteration of mood, usually being depressed or irritable; and (*f*) so keenly wishes for good health and strength with its infinite possibilities that her wishes lead to a riot of phantasying in the idealistic dream world of unreality; then in the prophylaxis naturally the points of attack are (*a*) allowing the patient less time for thinking by assigning various forms of occupation to fill her waking hours, (*b*) inaugurating self-disciplined thinking by explanations and by exercises, (*c*) denying the patient gratification of her desire to know all about her pathology even though the rules of practice building tell us that the best way to make a former patient become a patient-getter is to magnify and explain to her her own signs and symptoms, (*d*) affording the opportunity for frequent periods of mental rest, (*e*) having the nurse remove the causes of irritation and have the family and friends bring cheer and comfort, and (*f*) assuring the patient that the less interest she takes in her sickness, the more interest she maintains in the things which normally interest her and the fewer doubts and fears she has, the sooner she will be enabled to resume her natural place in the family and in society.

The fundamental prophylaxis is for the physician or surgeon to prohibit and absolutely interdict day-dreaming or phantasy formation—a too pleasant and too easy escape and refuge from the physical pain and mental dissatisfaction resultant upon being sick or convalescent, because the fee for emotional conflict and self-interest endures in the form of debilitating vivid memories much longer than the doctor's bill remains unpaid. Psychotherapy, training in mental discipline, augmented by occupation under supervision, are the constructive means of prophylaxis. Thus may chronic, mild or severe, mental-emotional invalidism be prevented, so that when the patient is discharged as recovered she is not afflicted with lingering sequelæ of her illness or disease necessitating subsequent treatment by a neuropsychiatrist. Since the etiology is different in the well-recognized type of traumatic neurasthenia and the insidious neurasthenia of convalescents, although the signs and symptoms in marked cases are much alike, the prophylaxis of cases developing while under medical care is a problem the physician and surgeon must be prepared to solve by the best means available.

Reviews

AN INTRODUCTION TO THE PRACTICE OF PREVENTIVE MEDICINE. By J. G. Fitzgerald, M.D., F.R.S.C., assisted by Peter Gillespie, M.D., and H. M. Lancaster, M.D., with additional chapters by several authors. The C. V. Mosby Company, St. Louis, 1922. Price $7.50.

As the author of this book points out in the preface, there have been during recent years very impressive changes in the attitude of the community as a whole to the problems of preventive medicine, it being recognized by the methods employed, in this comparatively new science, that an immense amount of illness and suffering may be avoided.

Dr. Fitzgerald tells us that the Province of Ontario spends about two per cent of its total revenue along these lines, and quotes with approval the motto of the New York State Department of Health, to-wit, that "public health is purchasable, that within natural limitations any community can determine its own death-rate."

From these preliminary remarks the reader may get some idea as to the character of this addition to medical literature.

Beyond emphasizing the need of full-time health workers as administrators, with physicians, sanitary engineers, and public health nurses, he emphasizes the importance of the well qualified physician in general practice who by his influence can aid very materially in the programme which he outlines.

After dealing in an earlier chapter with the aims and problems of preventive medicine, the author discusses the various acute infectious diseases, describing their modes of transmission and their methods of control, passing on then to tuberculosis, cerebrospinal meningitis, poliomyelitis, and the diseases transmitted by contamination of food through bacteria; insect-borne diseases; and diseases of unknown etiology. Venereal diseases and other infections are next thoroughly considered. After this there are chapters upon water-supplies and various liquid foodstuffs, with a consideration of food adulteration and food poisoning. Others deal with diet, another with community sanitation. The closing chapters of the book consider maternal and infant mortality and child hygiene, ventilation, industrial hygiene, demography, and public health education. There are appendices added containing a very large amount of information in regard to numerous subjects, such as regulations devised in different States and countries, and a description of the organization of dispensaries or clinics to aid in the cure and control of disease.

PROGRESSSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., assisted by L. F. Appleman, M.D. Volume IV, December, 1922.

This issue of Progressive Medicine contains an article of over one hundred pages upon Diseases of the Digestive Tract and Allied Organs by Dr. Martin E. Rehfuss of Philadelphia; a comparatively short one summarizing the literature of the subject for the past year by Dr. Henry R. Geyelin upon Nephritis; a condensed yet competent review of Genito-urinary Diseases, aside from nephritis, by Dr. Charles W. Bonney; Dr. Walter E. Lee has an exhaustive summary of the literature on Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures, Dislocations, and Tumors, covering more than one hundred pages; and the volume closes, as in previous years, with a summary of therapeutic literature during the last twelve months by Dr. H. R. M. Landis, in which review there are numerous references to material which has appeared in the pages of the THERAPEUTIC GAZETTE.